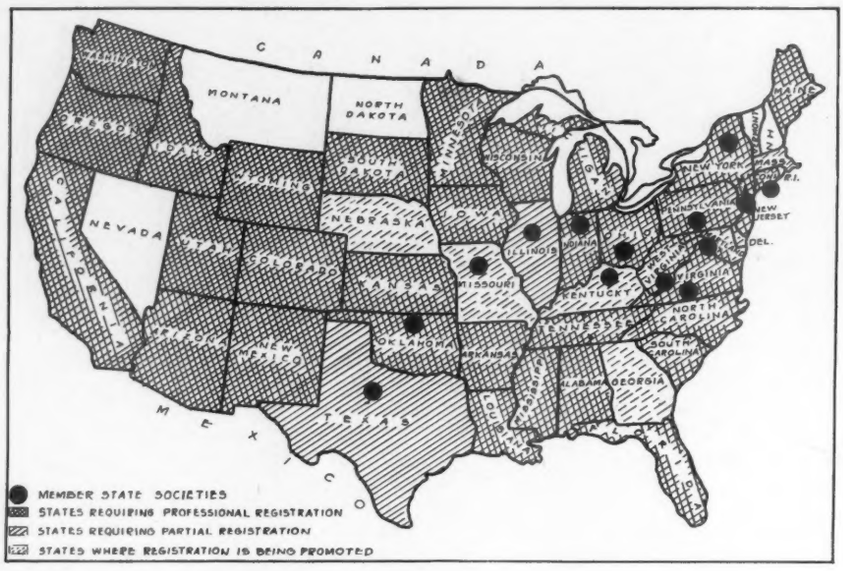
THE AMERICAN ENGINEER

FEBRUARY, 1937 PUBLISHED BY Twenty-five Cents
THE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS



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THE AMERICAN ENGINEER

Volume Seven **FEBRUARY, 1937** **Number Two**

Editorial Staff

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ROBERT HALL CRAIG
Editor-in-Chief

ARTHUR V. SHERIDAN
Associate Editor

WILLARD S. CONLON
Business Manager

Editorial and Advertising Offices
222 North Third Street
Harrisburg, Pennsylvania

EXECUTIVE OFFICE
National Press Bldg., Washington, D. C.

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THE COVER

Floods have held the attention of the Nation for the past month. Our cover picture, the most graphic photograph of mass terror we have seen, is of the crowds in Johnstown fleeing in fear because of the rumor that the Quemahoning Dam had burst—in the 1936 Spring floods. ***Photo by Universal News Reel —Copyright.***

The American Engineer assumes no responsibility for statements or opinions expressed by contributors. Their names identify the source of the same.

Subscription Rates

$1.00 a year, in advance, to members of the National Society of Professional Engineers and its affiliated Societies. $2.00 a year, in advance, to non-members. Single copies, $.25.

Entered as second-class matter February 17, 1937, at the post office at Harrisburg, Pennsylvania, under the Act of March 3, 1879.

For advertising rates write G. R. Bolan, 222 North Third Street, Harrisburg, Pennsylvania.

Current Opinion

Autobiography

I am Flood.

Before Noah built the Ark I roared, mile-wide through new-cut Pleistocene valleys from the melting feet of high, white retreating glaciers.

The glaciers passed; the forests came; I dwindled. Men came, the forests passed; the target grew and I grew with it. Each year I become stronger and stronger; my brown frothy crests rise higher and higher.

In the valleys which are mine the works of men crept out and out, encroaching, blocking, presuming. At first they did not matter. Then I came in my strength and destroyed the works of their hands. They built walls of earth and concrete to keep me out. I waited awhile and they forgot. Then I came again and in my wrath tore down those walls. So they built higher; they still build; I still tear them apart, for they are blocking my way to the sea.

* * *

They do not seem to understand, these earthlings of the valleys who scream so when I clutch their homes and whirl them away. Ever they push out into my valleys; ever they build their foolish walls; ever they rear their silly buildings and bridges in my path; ever the high hills where I have my beginnings are stripped of their forests and given to the plow that tears apart the spongy grass-roots of the hillsides.

Some day they may rob me of my strength in the hills and the little streams where I am born anew each time the snows melt and the great rains come. Some day they may fetter me, in the sources of my upspringing. Some day they may know what they really mean when they say that I, the Flood, always come from upstream.

But I am still free, gathering force from the Little Folk that run white and unchecked among the high hills; from the Greater Folk, that rise brown and sullen, fed by the Little Folk, and who at last find me, roaring in my might at rendezvous, where the little rivers meet, with all the power of the upland waters behind them, fed by every rill and brook and creek, glorying in the ancient angry rush to the sea.

So I charge down upon man-made things, laughing and roaring in their faces, breaking through their puny dikes: topping their floodwalls; singing a froth-brown song of death and disaster, sweeping them from my path, with all their braggings of power and vaunted conquest of the Primal Three.

And when at last my force is spent, I subside, lazily, with sucking chuckle among the sodden tangled debris, where lie wrecked homes and broken, dead things.

For already they say, before their feet are dry, "This is the worst. It could never be worse than this. Verily we will build higher walls and greater dikes. So shall the flood be kept from us another time."

This they have not learned, yet it is the song I have been singing to them through countless years, rising to smite them:

Where a flood has run, a flood shall run
And a greater flood anon.
And a greater still, till the stream from the hill
Is checked, and my power gone.

But to them that is just a silly riddle of brown water and noise. So I go about my business. I am Flood.

—Tom Hutton in The Binghamton Press, Mar. 26, 1937.

Engineering and Taxation

When the Depression began, American municipalities, generally, were near the limit of their borrowing power; so, when tax collections failed there was little to fall back upon. Part, at least, of this condition was due to the extravagant notions of engineers, whose recommendations, only, had been necessary and the magic was wrought, the money forth coming.

As the Depression grew worse, so did city tax collections. Some cities became bankrupt but all suffered some —even Baltimore, which had been among the most provident. A fine demonstration was had of the unfairness and impotency of the direct property tax at such a time.

It soon became apparent that the Federal Government should help, so the President accepted responsibility for the States. When asked for their requirements in Public Works, he received a list from City, State and Federal engineers of staggering length and cost. Engineering fancy had been set free as never before. Several Federal projects ran to two or three hundred millions apiece. The Brain Trust may have thought the engineer too cautious to direct the expenditure of billions, but engineering Utopianism certainly produced the list.

After all the Federal government has given the States —and to Maryland its share—Maryland is discovering many needs for new Public Works. Our Highway Engineer tells us that no longer will new topping be sufficient for asphalt streets, but a good portion of paving in Baltimore must be entirely re-built for heavier traffic, and proposes that part be included in each annual tax budget 'till all is finished. Governor Nice will recommend many millions for roads. Other acute needs may be expected to assert themselves.

The President, in his new budget, states his belief that after all special emergencies are past, six billions always will be necessary, whereas four were sufficient before the depression.

Surely, nobody indulges the thought that any future, near or distant, will reduce taxes—either City, State or Federal? The vicious circle is nearly complete. The more you're taxed, the less you have; the less you have, the more you're taxed.

Foreign nations are drunk with borrowing and increased taxing 'till their peoples often lack the simple needs of life. If only America would set them an example of frugality and simplicity—it would imply peace—what a fine world this might be!

In Maryland, we might make a beginning by heeding the recommendations of the Maryland State Planning Commission for planning all of our agencies in advance.

—From *The Baltimore Engineer,* January, 1937, Editorial.

Control of Floods Beyond Puny Man

Dr. Berkey Says "Reforestation, Levees and a Few Dams" Will Not Solve Problem. Would Move Populations; Columbia Geologist Favors Abandoning Dangerous Lowlands and Replanning River Cities.

Man can do nothing to prevent floods such as the one which has moved down the Ohio Valley, Dr. Charles P. Berkey, Professor of Geology at Columbia University, contends. Special reforestation, levees and dams—flood prevention efforts of man in such regions—cannot fully

(Continued on page 12)

EDITORIAL . . .

Flood Control Program

Flood Control Programs depend for their success upon at least three important factors—Political Expediency, Economics and Engineering, of which the least is Engineering. Coming from an Engineer, this statement may appear to be treasonous, but a closer analysis will support our view. It is now Political Expediency for all elective officers in State and Federal Governments to strenuously promote Flood Control. The wide spread suffering of the floods of March 1936 and January 1937 still haunts us. Therefore, all political parties will gladly promote Flood Control Legislation.

The first factor, POLITICAL EXPEDIENCY is now in Flood Control's favor, though it had not been in the past and may not be at times in the future.

The second factor, ECONOMICS, is the principal stumbling block, for when the tax burden is already heavy, the raising of additional large sums for Flood Relief structures is met with the natural opposition of the tax increasing authorities. States and local municipalities would shift the whole burden to the Federal Government if they could, but the present Flood Control Program, as set up in the National Flood Control Act of 1936, provides that each State must pay the cost of land purchased and damages sustained incident to the construction of Flood Control Works, be they dams or dikes or other. And but two States, namely, New York and Pennsylvania, have at this writing, passed adequate enabling legislation.

Does equity demand that each State pay its share or that the Federal Government bear the total cost? A minority of the States pay a majority of the taxes, but the majority of the States can spend the minority's money wherever it pleases. Those advocating 100% Federal participation in Flood Control programs, do so with the full knowledge of that fact. Their are however, some offsetting arguments.

As to ENGINEERING, why do we say it is the least of the three? Because, as always, all that it is necessary to do, is to give the Engineer adequate funds and he will develop a program of gradual Flood Control which will finally solve the problem.

The Corps of Army Engineers under whose efficient administration Flood Control has been carried on for many years, is prepared to construct dams, dikes and other works already planned and designed, the moment the economic and political problems are solved.

The National Resources Committee has recently submitted to the President a Public Works Planning program recommending a proposed policy for planning, programming, timing and division of cost of Public Works.

This report is based on special investigations by the Water Resources Committee, by the Projects Division of the Federal Emergency Administration of Public Works and by a special research staff on Division of Cost of Public Works.

Part 2, Drainage Basin problems and programs, represents "a first attempt through the joint efforts of Federal, State and local agencies, officials and non-officials to formulate a National Water Plan and Program."

The general report recommends—

1. Creation of a National Public Works authority.
2. Panel of appraisers for allocation of costs.
3. Committee to fit the Public Works program into the National economic system when stabilization is needed.

The issue will immediately rise as to whether the proposed Public Works Department will be responsible for major flood control structures in the future or whether it shall remain in the hands of the Corps of Army Engineers.

No matter where responsibility is placed or how the program is financed or when political expediency calls for it to be done, it is basically an engineering project and would give employment to many engineers over the next decade.

NATIONAL SOCIETY NEWS

National President Visits Ohio Society Annual Convention

Left to right:—Hon. J. Freer Bittinger, former Speaker of the House of Representatives; Arthur V. Sheridan, President, National Society of Professional Engineers; Perry T. Ford, President, Ohio Society of Professional Engineers; Toastmaster, Hon. Arthur H. Day, Judge of Supreme Court of Ohio; J. R. Burkey, Vice-President, Ohio Society of Professional Engineers. Honorable Martin L. Davey, Governor of Ohio, who was also a guest at the convention banquet, is not on the picture.

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AMERICAN ENGINEER
1936

There are available a limited number of bound volumes of the 1936 issue of the AMERICAN ENGINEER. You may secure one of these volumes with your name engraved in gold letters for $5.50 plus postage and your complete set of the 1936 issues.

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This will make an excellent addition to your library.

WILLARD S. CONLON,
Executive Secretary.

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In the event that your address has been changed, or if you are contemplating a change in the near future.

TRAVEL LOG OF A PRESIDENT
January 10-February 14, 1937

Early in January the President of the National Society of Professional Engineers, in response to numerous invitations, set forth on a 5,000 mile journey which was to take him through nearly half the states of the nation.

Following is a brief log from which has purposely been omitted all personal references and details:

◈ ◈

DISTRICT OF COLUMBIA

Addressing the District of Columbia Society on January 12th at the Hotel Raleigh, Washington, he witnessed the installation of the newly elected officers for the year 1937. Keen interest in legislation and civic affairs affecting the capital was an outstanding and encouraging reaction. It is to be hoped that the engineers of the District of Columbia will profit by the experiences encountered in other states and will follow the lead of better established professions in eliminating recognition of branches of engineering in all matters of legislation, including registration. A proposal to establish schedules of fees and salaries for local use is under consideration. National Vice-President Perry Ford, of Ohio, gave an illuminating and encouraging dissertation on the effectiveness of the schedules established by the Ohio Society.

◈ ◈

INDIANA—MISSOURI

An announcement, most timely, advised the audience that on January 9th the Indiana Society of Professional Engineers was organized and on January 10th the Missouri Society of Professional Engineers came into being. Engineer Secretary Conlon arranged, attended and directed the organization meetings in both cases.

◈ ◈

OKLAHOMA

Moving to Oklahoma City, by way of St. Louis, one witnessed the first real signs of winter encountered by the traveler. Both States had experienced somewhat colder and stormier weather than Eastern cities. The Oklahoma Society staged a splendid meeting, including a noon-day luncheon and an evening banquet at the Skriven Hotel. Addresses of welcome and commendation were offered by state and municipal officials, including the City Manager of the Capital of Oklahoma. More than two hundred engineers attended the luncheon which was followed by an interesting and enlightening meeting of the Society. The enthusiasm and optimism of the reports presented by officers and committee chairmen explained why the recently formed Oklahoma Society already has approximately 75% of all the registered engineers of the State on its rolls. In the evening the members were accompanied by the ladies and, after an address by the traveler, enjoyed an engaging set of entertainers and general dancing. Oklahoma has a society which is truly representative of the profession in that State. The effectiveness of the campaign against violation of the practice merits commendation and emulation.

◈ ◈

TEXAS

After a stop at Dallas, the traveler was a guest at a dinner in the Hotel Driskill, Austin, the attractive capital of Texas, where was extended by the Mayor a most cordial greeting. Following the dinner, which was attended by engineers from various cities in the State, he delivered an address in the auditorium located in the Geology Building of the University of Texas. The visitor was greatly impressed by the calibre of the engineers directing the affairs of the new Texas Society and the interest displayed in the professional movement. Legislation creating a professional practice act was introduced on January 16th. Conferences and a visit to the capitol left one with the impression that passage of a registration law and the information of additional chapters were assured.

◈ ◈

KENTUCKY

Traveling on to Houston and New Orleans, and thence to Jacksonville and Miami, the flood situation began to divert attention to a great problem confronting the nation as a whole. This problem, if possible of solution, will command the attention of engineers for at least a generation. New Orleans was concerned about a river already eight feet above normal and Florida, Mississippi, Georgia and other states were engaged in raising funds and divers endeavors too pertinent to dwell on engineering society matters. Louisville, the scheduled meeting place of the Kentucky Society, was inundated and the convention of the Kentucky organization had to be indefinitely postponed and a tentative schedule upset. Aside from several conferences a stay in Florida became a pleasant vacation with plenty of relaxation and little rest.

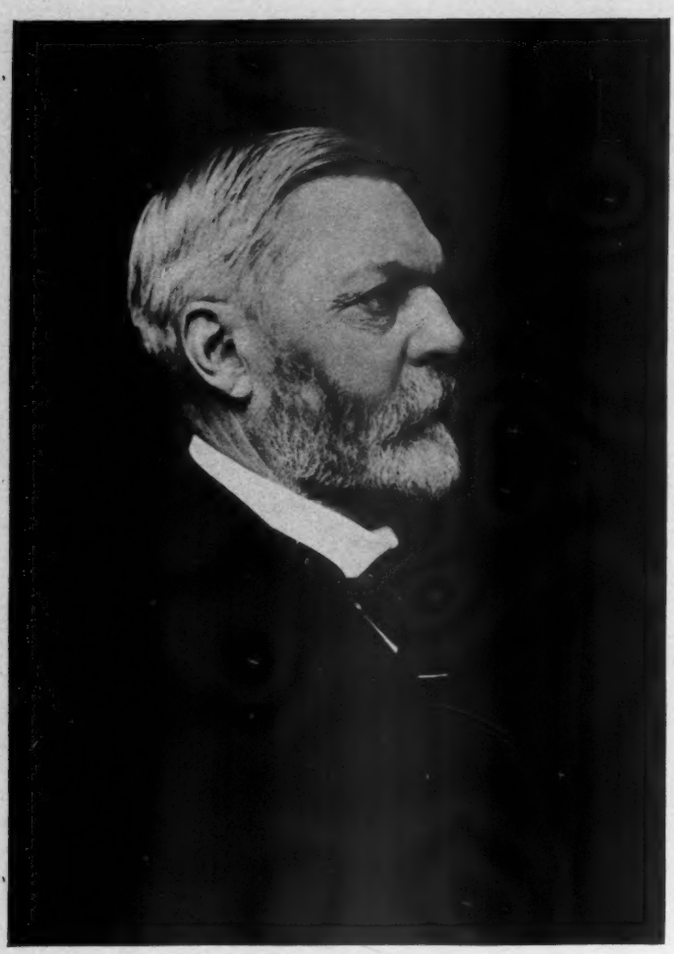
◈ ◈

OHIO

Returning north by way of Atlanta, Chattanooga and Cincinnati we reached Columbus in time for the annual meeting of the Ohio Society of Professional Engineers. The Hotel Deshler-Wallick presented the appearance of a convention headquarters. With the lobbies filled by engineers and visitors viewing exhibits, the entire mezzanine floor occupied by committee and section meetings, rooms everywhere occupied by visitors and exhibitors all prepared to entertain and refresh one, and cities and colleges holding reunions, the aspects of a real convention were everywhere apparent. On the evening of February 12th the trouper made his final address in the presence of the Governor of the State, a presiding Supreme Court Justice and a crowded banquet hall, after which, with difficulty, he extricated himself from the harmony and hospitality of the members of a Society that is already a force recognized and respected by both the public and officials of the Buckeye State. Entraining at 2:40 A. M., a tired but pleased itinerant, arrived back in New York on the evening of Saturday, February 13th, after an absence of almost five weeks.

To all whom he met, particularly those whose gracious and kindly hospitality helped to make his several visits pleasant recollections, your scribe expresses his appreciation for the services they are rendering, not alone to the profession, but to the public for whom the profession exists.

ENGINEER ARTHUR V. SHERIDAN,
President.



We Present This Month

An Outstanding Engineer

Washington Augustus Roebling
(1837-1926)

Washington Augustus Roebling, civil engineer, born in Saxonburg, Butler County, Pennsylvania, May 26, 1837, was a son of John Augustus Roebling, engineer, bridge builder and manufacturer, and one of the early settlers of that county. Roebling was educated at Renssalaer Polytechnic Institute, Troy, New York, then the leading school of professional engineering in the country.

Upon receiving his degree Roebling started to work in his father's wire rope mill in Trenton, New Jersey, where the family had moved. A year later he joined his father in Pittsburgh and assisted in building the Allegheny River Bridge. Upon the completion of the job he returned to Trenton and enlisted as a private for Civil War service, from which rank he rose rapidly and was commissioned a lieutenant-colonel. His duties during the war included a considerable amount of bridge building, notably the construction of suspension bridges across the Rappahannock and Shenandoah Rivers. At the close of the war he returned to his profession of civil engineering. He spent the year 1868 abroad conferring with the leading engineers in England, France and Germany and studying especially the principles and practice of caisson foundations, with a view to helping his father in the newly projected Brooklyn Bridge, of which the elder Roebling had been appointed chief engineer. Immediately on his return from Europe, he entered his father's office as principal assistant and prepared the detailed plans and specifications for the great bridge. The elder Roebling died just as the field work was beginning and his son succeeded him as chief engineer.

The Brooklyn Bridge project was unprecedented in many ways and the details of procedure needed constant watching and direction. The foundations of the great towers were built by the caisson method, under compressed air, and the chief engineer spent long hours in the damp high-pressure of the caisson chambers. Caisson disease, the dreaded "bends," attacked the laborers; at that time little was known of methods of treatment and much had to be learned by costly experience. One afternoon in the spring of 1872, Roebling was taken almost unconscious from the caisson on the New York side, but in a few days he was back on the work. By the end of the year, however, his health had been seriously and permanently affected, and he did not visit the bridge site again. From that time until the bridge was finished in 1883, except for six months abroad in a vain attempt to regain his health, he directed the work from his house in Brooklyn, too sick to leave it. Such a record, a decade of exacting work, is a rare tribute to the man's mental alertness, minute knowledge of technical detail, and gift for effective organization. During much of this time he maintained an active part in conducting the business of the John A. Roebling's Sons Company, of which he became president upon its incorporation in 1876.

Owing to his seriously impaired health, Roebling took no further active part in professional engineering work, although for a short time, at the age of eighty-three, he resumed the presidency of the Roebling Company, and during his brief administration took and filled the contract for the Bear Mountain Bridge over the Hudson. He died in Trenton on July 21, 1926.

The Flood Situation

As Seen by Engineers and Non-Professionals
Comments and Opinions From Here, There and Everywhere

The past flood is a keen indication of the fact that the successive floods will continue to get higher and higher, and it is only by the narrowest margin this year that we so far have escaped a wide-spread and terrific devastation. All that was necessary was a few weeks more of high water or a little coincidental bad weather to destroy the effects of inadequate and weakened man-made flood defenses. Our luck is holding so far, and we can only pray that it will continue to hold until the flood season is over.

I consider that this is the most vital problem that our nation has to face today, and that engineers should take a leading part in assuring to posterity the continuation of a virile country, instead of handing down to them a devastated, eroded land subject to destructive floods, rendered incapable of supplying subsistence to its inhabitants.

As a step toward adequately meeting this constant national menace, I would urge upon the Army Engineers the necessity for broadening their tremendous endeavors, by breaking away from the precedents and traditions of their historical organization far enough to approach in an open minded and sympathetic manner the matter of Upland or Upstream Engineering to reduce surface run-off not only by storage reservoirs, but by contour lateral ditches, surface water distribution, reforestation, soil conservation, land restoration, water and soil retaining agronomy, silt catching, terrace and contour farming, gully damming, cover and soil building crops, restoration of drained natural ponds and swamps and old mill ponds, diversion of water from hill road ditches, and other methods of holding water in the land in the region of precipitation, which at conservative estimates, will result in a reduction of at least 25% of the amount of surface run-off, and decrease to a minimum the eroding and carrying away of valuable topsoil, that is now being deposited as silt in our river and reservoir bottoms, filling them up, decreasing their capacity and dangerously raising our flood levels.

The efficacy of these methods have been proved by measurement of large scale trials and experiments over the years, and through cooperation and understanding should be used in order to put their values to good effect and should be regarded to the fullest extent that they deserve.

Yours very sincerely,
HARRY E. HARRIS, Chairman,
National Committee on Flood Control and Soil Conservation.

PUBLIC PLANNING FOR NATIONAL WATER CONTROL

The National Resources Committee at Washington has just issued a limited edition of its report on *Public Works Planning.*

This was published December 1, 1936 and transmitted to Congress by President Roosevelt on February 3, 1937. A report recommending a proposed policy for planning, program, timing and division of costs of public works, including a report on Drainage Basin Problems and Programs. The report was prepared by the Projects Division of the Federal Emergency Administration of Public Works, a special research staff on division of costs of public works and the Water Resources Committee of the National Resources Committee.

The report on Drainage Basin Problems and Programs represents a first attempt through the joint efforts of Federal, State and local agencies, official and non-official, to formulate a national water plan.

The report is divided into three parts, preceded by findings and recommendations and followed by two appendices.

The following sections make up Part 1, Section I, The Problem—Volume and Types of Public Works; Section II, Planning and Selection of Projects; Section III, Programming the Works; Section IV, Timing and Division of Costs.

Part II includes Procedure, Policy and Recommendations; Drainage Basin Summaries and Project Tables; the Method of Study.

Part III, which discusses Division of Costs and Responsibility, is divided into the following: Section I, Principles and Policies by Simon E. Leland; Section II, Federal Public Works and Grants in Aid; Section III, Bases and Methods of Cost Allocation. Appendix A deals with Authorized Federal Grants in Aid to the States and Appendix B treats of British Grants in Aid.

This report is of great importance and should be fully discussed by the Professional Engineers. Its careful study is commended to all engineers and particularly those throughout the Nation who are Members of the National Committee on Flood Control and Soil Conservation, those of the various State Committees on Flood Control and Soil Conservation, those who are serving on State Planning Boards, or those who are taking any active interest in the important problems of Flood Control, of Public Works, or interstate cooperation.

Copies of *Public Works Planning,* printed 221 pages, paper cover, quarto, illustrated, may be obtained at this time from the Superintendent of Documents, Washington, D. C. for 60 cents.

ELMER H. BEARD, Member,
Connecticut State Committee on Flood Control and Soil Conservation.

From an editorial by George C. Waldo, Editor-in-Chief of the BRIDGEPORT TELEGRAM, *pointing out in a comprehensive way the axact situation which must be adequately met by the engineering profession if we are to have any real relief from the menace which confronts the future of the Country.*

It is all very well to formulate flood programs, as is being done at present, and quite all right to contemplate the expenditure of billions of dollars for the work. The magnitude of the undertaking is now pretty generally understood.

The greatest trouble, however, with plans so far put forward for flood prevention, is that they contemplate expenditure and construction carried on over a number of years. The task ahead is so huge that it cannot be finished in what would be considered record time. People who have been flooded out of their homes this year by the greatest flood in all history have the engaging prospect

(Continued on page 12)

Ten Facts on Technology and Employment

Submitted as a Statistical Proof of the Contribution of Science and Machinery to Employment and Higher Standards of Living

Reprint from Pamphlet Machinery and Allied Products Institute

FOREWORD

MACHINERY exerts one of the major influences shaping American civilization.

It is credited with making available countless goods and services unknown to an earlier generation, and with removing from modern life much of the hard physical labor of past years, both industrial and domestic.

At the same time machinery is blamed for many of the economic and social problems of the day. It is often charged that the increasing use of machinery lessens opportunities for employment—that if a machine operated by one man does as much as twenty men could do by hand, nineteen men are deprived of means of livelihood.

Accurate knowledge of the effect of machinery on employment cannot be gained through such generalizations from individual cases, which are predicated upon the assumption that the same projects could and would be undertaken by hand labor as are possible when machines are available, and that therefore men would have been hired to do the work that is being done by machines. Other factors are also involved, such as employment of men to make the machines, to produce the increased amount of raw materials needed, and to sell, transport and service the resulting larger volume of goods.

To find the true effect of technological advancement requires a broad examination of employment statistics at different stages of the development of our industrial system, the trend of those figures, the types of work at which wage earners are employed, and the changes brought about in social and economic standards.

Such study reveals that machinery makes it possible for old industrial activities to be expanded and new enterprises to be undertaken creating millions of new jobs. The net results of technological advancement is a great increase in employment and attainment of a higher standard of living through the efficient production and distribution of goods and services.

It is the purpose of this pamphlet to present in concise form the principal facts on technology and employment—a subject of vital importance to the welfare of the nation.

TEN FACTS ON TECHNOLOGY AND EMPLOYMENT

1. Jobs Increase Faster than Population

Between 1870 and 1930 the population of the United States increased 218 per cent, while the gainfully employed increased 291 per cent. Shortly after the Civil War, before the great strides in technological advancement had been made, 324 persons were employed in producing the goods and services for each 1,000 inhabitants. By 1930 a higher standard of living, resulting largely from development of machinery, had created so many new desires that 400 persons were at work filling the demands of each 1,000.

There was a gain of 20,000,000 new jobs during the period of most intensive technological advancement, 1900 to 1930. For each 1,000 of the 47 million added population 422 new jobs were created in this period of twentieth century development.

2. Employment is Nearest Normal in Most Highly Mechanized Industries

If unemployment were due to machines displacing men it should be most severe in the industries where machines are used most. However, it is nearest normal levels in the most highly mechanized industries, such as automobile and textile manufacturing, in the paper and printing trades and other intensely developed manufacturing industries. Most of today's unemployment is in occupations in which machines are used least. It is severest in building construction, the service trades, foundry and machine shops and heavy machinery manufacturing where most of the work is done by skilled men.

3. Eighteen New Industries, Resulting from Machinery Development, Have Created Millions of New Jobs

One of each seven factory workers today has a job making some product that was unknown to his grandfather fifty years ago. Eighteen of the major manufacturing industries of today have been wholly developed since 1880, and they would not be in existence except for technological advancement which has taken place since that time. They are responsible for the employment of 1,000,000 workers in manufacturing alone. It is impossible to determine accurately the additional millions who receive employment producing and processing raw materials for these industries, and handling, servicing and selling the finished products, but it may be conservatively estimated that one out of every four persons gainfully employed today owes his job to one of these eighteen new industries.

4. Growing Occupations Add Three New Workers While Vanishing Occupations Lose One

Between 1920 and 1930 the nineteen principal growing occupations gained three times as many workers as the nineteen principal vanishing occupations lost. In 1930 there were 321,322 more draymen, teamsters and stable hands than in 1920; 134,000 fewer millwrights and diesetters; 75,000 fewer dressmakers in homes; and 74,000 fewer blacksmiths. The total loss in the nineteen declining occupations was about 800,000, as contrasted with a gain of more than two and a quarter million in the nineteen growing occupations. The gain consisted partly of an increase of 687,000 truck drivers and chauffeurs; 356,512 mechanics; 428,945 building and general laborers; 205,899 painters and glaziers; and 158,000 hair-dressers, manicurists and barbers. A significant fact in connection with this change in occupations brought about by technological advancement is that less arduous, more pleasant and better compensated jobs displayed old, strenuous, hazardous occupations. The trend toward more pleasant work and better working conditions has paralleled the development of machinery. An outstanding example of this is the decline in child labor from one out of every

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Mathematical Machine

The simultaneous calculator, a new machine developed at the Massachusetts Institute of Technology by Mr. John B. Wilbur of the Department of Civil Engineering, for the solution of simultaneous linear algebraic equations to nine or more unknowns. Once the conditions of the equations have been set on the machine a single movement of the mechanism carries out in a few seconds mathematical processes that might require hours or days by ordinary methods. The calculator has 13,000 parts, including more than 600 feet of steel tape and nearly 1,000 ball-bearing pulleys. Dr. Wilbur is shown with the machine.

DEVELOPMENT of a mathematical machine capable of solving nine simultaneous linear algebraic equations involving nine unknowns was announced at the Massachusetts Institute of Technology last night. Designed and built by Dr. John B. Wilbur in the department of civil engineering, the new machine now takes its place in the broad program under way at the Institute for the mechanical solution of mathematical problems which baffle and delay progress in engineering and research.

During the three years in which the new machine has been under development, Dr. Wilbur has had the close cooperation of Dr. Vannevar Bush, dean of engineering, whose own contributions in the field of mechanical solution problems have received wide recognition.

Equations of the type solved by the new machine, which is known as the simultaneous calculator, constantly occur in engineering and scientific analysis covering a wide range of fields. Designed originally for the solution of problems in civil engineering, such as the complex calculations that arise in the design of skyscrapers, the calculator promises to be useful in such diverse fields as nuclear physics, geodetic surveying, genetics and psychology. For the mathematician it is a new tool for the evaluation of determinants.

Simultaneous equations are mathematical expressions which relate a number of unknown quantities in such a way that the value of each unknown may be determined by a simultaneous consideration of the relations involved. In the design of a great suspension bridge, for example, the stresses in each structural member of the towers depend upon the stresses in every other member. Moreover, each of these stresses depends upon the physical elastic properties of the members themselves. The stresses can be determined by solving a set of simultaneous equations which correlate the various stresses. In the usual analytical solution the effect of each equation upon the others of the group considered can be determined only after a laborious manipulation of the factors, leading gradually to a solution.

Once the coefficients and constants of the particular equations to be solved are set up on the new calculator, a single movement of the mechanism accomplishes mechanically in a few seconds mathematical processes which might take days if carried out by the usual methods of calculation.

The simultaneous calculator, which weighs 2,000 pounds, has more than 13,000 separate parts, including six hundred feet of flexible steel tape and nearly a thousand ball-bearing pulleys, is the outgrowth of an experimental laboratory model built by Dr. Wilbur in 1934. The new machine has undergone exhaustive tests and is now in active operation. Construction of the simultaneous calculator was made possible by a fund established by Sir Douglas Alexander of New York.

Built for the direct solution of nine simultaneous equations involving nine unknowns, the machine may be operated to solve equations containing even a larger number of unknowns. Accuracy of results to any degree required may be obtained by successive solutions, each one yielding greater accuracy than its predecessor.

SPEAKING OF PUBLICITY—

"Professional Engineers must now have a license from the State to practice their profession in Connecticut, a good law indeed, but the State College of Connecticut should be enabled by the State Legislature to give a complete course of Engineering, by providing that college with the best and most up to date equipment and building for that purpose. Connecticut is a manufacturing state, but Connecticut boys and girls that cannot afford or do not wish to attend Yale have to go out of the state for an Engineering Education."

Engr. L. Heres DeWyk is to be complimented and commended for his initiative in starting this very helpful and valuable work in Connecticut. He has shown the way, and it is to be hoped that others will come forward with similar opportunities for well directed publicity in all the other States."

The Works Program

Works Progress Administration

Excerpts from Paper Presented by PERRY A. FELLOWS

Assistant Chief Engineer of the Works Progress Administration, at the second annual convention of the National Society of Professional Engineers held recently in Washington, D. C. Subject of paper: "Evaluating Work Relief".

IN discussing, in an orderly and unbiased fashion, any kind of work program, it is advisable to consider not alone the physical accomplishments, but also the purpose for which the program was conceived, the planning, the direction, and many other things including the speed and spirit of the execution.

Purpose. In the case of a work program designed to provide relief employment, the reason for doing the work is the first thing to be considered, as well as the most important, even though the end product may give full return for the money spent. If the work had been initiated merely to accomplish the economical construction of certain selected projects and the purpose of the evaluation was to determine whether or not these completed structures were built with the minimum expenditure of dollars, then the method of procedure would be fairly clear. A success of that kind might be a failure as a program of relief employment. The purpose which led to the initiation of a program of relief work was not primarily the economical construction of public works, but a quite different one; one, however, not necessarily incompatible with true economy. Any attempt to make an evaluation of the program should impartially recognize the original intent, the size of the job, the physical results of the work, and the other things that make the Works Progress Administration program a great humanitarian enterprise.

Planning. The program was conceived to fill a need. If the planning had not been in harmony with that need, the work would have lost value. The real pinch of disemployment, want and hunger, was felt locally, pretty close to the individual. The effects of correction had to come close to that same spot. Since that correction was in the form of a work program, the projects selected had to fit that plan. They had to be wide of range and varied in character. They were not the result of the expression of some individual's whims, but, within the limits of the law, were an attempt to provide work for people who were in need. The skills of these people were of every conceivable variety, and the location of their homes seldom conveniently near the site of an easily developed project. They were people who were known to the authorities in their communities. These same authorities were confronted with the task of planning the projects to fit the abilities of these particular people. And so the determination of the character of the projects and the selection of the people for whom these projects would provide work opportunities was a matter of local planning. That is one of the reasons that most of the shallow criticism is of the long range, arm-chair variety. The people close to the job know some of the parts to the problem that the easy-answer people forget.

Design. Engineers are often personally, and as a rule professionally, interested in the design stage of planning. There was a formula for the manner in which the application must be made for Federal funds for Works Progress Administration projects. This provided for proposals from the local people which were later translated into formal application and, if allowable, into authorizations. One of the first provisions incorporated in this formula was that the responsibility for the design rested with the sponsor. In general that is easily understood, because the local official when installed in his office is given the responsibility for certain well-defined work. This responsibility is quite independent of relief work and is one that he cannot relinquish to another unless he relinquishes at the same time his right to office. Without giving up this responsibility he may enter into an understanding with somebody who will aid him in carrying out his work and his responsibility. In general that is the nature of the relationship that exists between the Works Progress Administration and the local sponsor. The affirmation of the sponsor's responsibility for the adequacy of plans, designs, and specifications, and for the accuracy of engineering calculations in connection with projects for construction, is a part of that agreement.

Supervision. Resting on the careful determination of the relationship between the local sponsor and the local Works Progress Administration is the authority and responsibility for the supervision of the projects as they proceed. The integrity of the project in a large measure depends on the character of this supervision. Therefore, it is necessary for anyone attempting to analyze the program to learn about the basis on which this responsibility is established. If the project provides for the paving of a street or similar municipal construction, the officials of the municipality are obviously the ones on whom the responsibility for the care and maintenance of the finished work will lie. This responsibility for the finished project requires that they have a corresponding measure of authority in maintaining project integrity during its execution.

Engineers. The engineer's share in the planning, supervising, and general carrying out of these projects is of particular interest. We have no established way of accurately estimating the number of engineers which the sponsor has employed in the preparation of the plans for projects which have been submitted and which are underway. Obviously the number is great and includes not only those in regular municipal service but the supplementary aid of consultants and temporary additions to staff. To supplement the sponsor's work and to provide engineering supervision of the execution of the designs on behalf of the Federal Government, there are many engineers employed on the Federal payrolls. Many of these are from your own organization. They may be justly proud of the way in which they have been able to carry the work. It is under the direction of such engineers that the employment has been so speedily provided for two and one-half million men and women from the relief rolls on 90,000 Works Progress Administration jobs. The thousands of community improvements which they are building will be of lasting benefit to the community which

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Intellectual Endeavor

The Results of Technical Activity and the Role Played by the Engineer Have Greater Influence and Less Recognition In Directing the Affairs of Mankind Than the Industry Which They Develop

By M. AVICE

(Translation from the French by W. A. Herckenrath)

IMPORTANCE OF INTELLECTUAL WORK.—The labor of men is differentiated from the work of animals by the collaboration of the mind, and everyone admits that the work of a horse dragging a plow can not be compared to the work of the laborer who guides the team. In like manner the manual work of a laborer can not be compared with the intellectual work of men who have invented, calculated, planned the best models of plows and who originated the technicalities of the construction.

Animal labor is measured in kilograms: manual labor is measured by the time consumed and the results obtained: but intellectual work, although similarly measurable by its results, can be so measured with difficulty "because the measure must extend back over a long period." (For example it took 70 years' of experimenting between the time of the output of the first laboratory telegraph and the year of Morse's final practical solution, and by the time the realization of his efforts matured Ampère, who had contributed so much to the success of the undertaking, had already been long dead.) That is why the attempt to measure intellectual work with precision has been abandoned, accustomed as we have become to consider the fruits of scientific research and invention as heavenly benefactions due to all of us. The workman is convinced that the machine belongs to him because he manufactured it, and the capitalist imagines that he is its sole proprietor because he paid for it. But these two antagonists forget to take account of the intellectual worker who created it, and whose contribution, as we shall see, is far from being negligible.

In order to construct some object we need a factory, tools, materials, hand labor, all of which can as readily be evaluated in hours of work put in by miners, metallurgists, foundrymen, etc., as in monetary units subject to fluctuation. In fact production of raw materials can be resolved into miner-, metallurgical- etc. hours just as the hand work directly applied. And likewise, factory buildings and industrial equipment being resolvable into hours of work, their amortization per article produced can likewise be expressed in hours of work.

For the mechanical construction, of a plow for example, there are needed motor machines using combustibles, lubricators, all sorts of machine tools, transmissions, worn out tools, repairs, etc., the whole of which represents absentee handwork availed of elsewhere. Every machine means other workmen and other machines which presuppose still others, and so on, so that the problem, though quite simple, yet appears to be unsolvable.

In fact, when the manufacturer of a plow makes use of a forge, for example, he does not forget that it has cost him P dollars, and that during its life it will perform only N operations, on which account he attributes to each piece, over and above the accompanying hand-work, a supplementary cost $\frac{P}{N}$ (P÷N) which takes previous labor into consideration.

Now, the manufacturer of the forge had done the same thing, and what we have said of the forge is equally true for all other machines, so that in fixing the cost price of the plow the manufacturer takes into consideration automatically without knowing it, not only the working hours expended directly on the plow but also the labor bestowed on every machine and on the entire mechanical genealogy.

Under these conditions, if a comparison of the hours allotted to the cost price of an article and determined with equal exactitude and without any omission at two different periods where different technique is employed, —if such a comparison indicates an economy of manual labor, it will have to be admitted that this variation is due to the difference in technique, in other words to intellectual labor.

Let us remark, on the other hand, that the class of intellectual workers never receives, during life, the entire product of its labor.

In fact, an author, litterateur, inventor, or scientist, often lacks during his entire life even what is absolutely necessary, even though his articles, works, or discoveries be destined to confer on future generations prolonged and gratuitous services. Consequently, in all justice, if every class were entitled to the entire product of its labor, the actual product of defunct technicians ought to be paid to living technicians whose actual work, which will become productive in the future, finds an equivalent measure in the actual product of the technique of all times, that is to say the saving produced in the labor of man.

Let it be understood, however, that there is no intention of remunerating, on this basis, the productivity of the technological class, but only of having it serve as a measure.

When machines produce more and consume less, their output is bettered, and there results a better utilization of medium and fuel, which in the long run means a decided economy of human labor.

It is the cost of this economy which has to be calculated if the importance of actual technical work is to be properly evaluated.

COST OF TECHNICAL INTELLECTUAL LABOR.—In 1901 the agriculturist Ringelman, making a comparative test between an 1801 model plow and a 1901 model, found that the ratio of traction per unit section of tilth was on an average of 3.75 to 1. From this it follows that the same team with the same driver could with equal exertion, and therefore in the same time, till 3 hectares 75 acres of land with the 1901 model as against 1 hectare tilled by the 1801 model. This economy of about 75% is surely due to the progress in plow construction, the sole difference being due to the plows themselves.

Everyone knows that plows are sold by weight and that the price per kilogram with the same manufacturer is obviously independent of the model considered. We can therefore compare the price of a modern plow with

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Control of Floods Beyond Puny Man

(Continued from page 2)

solve the problem, and the populations of the dangerous bottom lands should be moved elsewhere and the river cities replanned, Dr. Berkey said.

Nature is the master and man should not "dispute the right of way of one of nature's giants," he declared.

After asserting that most popular explanations for such natural phenomena as floods are unsound and that the cures proposed are usually hopelessly inadequate, Dr. Berkey said that the "lack of appreciation of geological processes and failure to take note of the danger signals lead to one disaster after another year after year."

"Nature Will Have Its Way"

"Special reforestation, levees and a few dams are expected to do what they have no competence for" he asserted. "Spoonfuls of water are impounded while lakefuls on upper reaches flood the courses of our river systems. Nature has its own way of disposing of an oversupply of rain or melting snow.

"It would be immeasurably more distressing if these waters were spread out over the surface of the ground to lie there stagnant until dried up by evaporation. Gravitation compels it to flow and the gathering of this run-off forms the streams that finally on occasion build up great floods.

"But they all follow the lines charted by the river itself in more orderly times when its chief work was to dig a channeled course for its own accommodation.

"The plain fact is that a river has nowhere else to go. The inner channel carries the stream in normal times, but in flood the valley bottom is covered also, and in great floods even the lower terraces are reached. The point is that these lands are its own property. Any one encroaching on these particular lands is a trespasser in yearly danger and will learn by experience, if not otherwise, that nature is still master.

Predicts Remedial Action

"Although in occasional instances special protective measures or diversions or impoundings are partly effective, the principal move indicated by the facts is very different. We are slowly learning that some of the things we have tried to do cannot be done. Our effort by comparison is too puny. "The cure of flood disaster is essentially the same. Dangerous bottom lands should not have been occupied, of course. We know well how they come to be and why the stricken people return to the same spot in the vain hope that such a visitation may never come again. But the time must come when better plans will be laid. Helpless populations now crowded along the river bottoms in our great cities will be provided habitations beyond the reach of danger. Cities can even be replanned.

"Instead of praying that the windows of heaven may be closed, or instead of attempting to dispute the right of way of one of nature's giants, perhaps it would show great wisdom to accept the situation and turn such portion of the river bottom as it must occupy on occasion back to the river again. Nature has provided a very demanding use for these places and apparently the thing for man to do is to observe nature's danger signs and provide ways of meeting his own needs."

Dr. Berkey is secretary of the Geological Survey of America.

—From *New York Times,* Sunday, January 31, 1937.

The Flood Situation

(Continued from page 7)

of facing the same situation again in 1938, and possibly for one or more years after that, until the flood control programs have been carried on far enough to cover their cases.

Then there are other phases of the whole situation to be considered. Many dams and levees which held out against the floods this year may now be undermined by the water, or may not be high enough or strong enough to meet another unprecedented flood. That means that in addition to the advanced programs which are contemplated there must be a general strengthening and raising of much of the construction which is already in place.

And in the meantime, what assurance have this year's victims that they are to be protected in the future? Just what advice can be given to these unfortunate people about a future course? Are government engineers to stroll about the countryside warning homeowners and renters to abandon what they cannot carry away and flee to higher ground? Some of the levees which barely held this year, and at whose tops the waters hungrily licked, stand as very insecure protection for the future. What is the porspect of establishing a home and raising a family behind such a flimsy barricade?

Indeed, there are many plans for flood control, but just as many doubts as to their effectiveness. We need not think that the problems have all been solved.

To The Editor:

On Page 5 of the January issue of the AMERICAN ENGINEER, you have a flash *"Engineers—Attention—Floods."*

As you probably know, there have been several articles in the past relating to the Soil Conservation and Flood Control activities of this Committee and the Connecticut Society published in the AMERICAN ENGINEER.

The very crisis which we have tried to have averted by nation wide propaganda, based upon our resolution (enclosed) of March 1936 which was later adopted by the National Committee, has come upon us. While our work has borne considerable fruit in Government Departments, the Congress, State Officials and Legislatures, and in engineering bodies and the public press, the inertia toward a proper program for co-ordinated action has been only overcome to a comparatively small degree, the country continues to allow our valuable topsoil to be washed away, leaving desolation in the land, filling up reservoirs and river bottoms with silt, with the result that each succeeding year, less of the moisture precipitation is absorbed into the earth and more and more becomes a rapid surface run-off which causes higher and higher floods each successive year for both the reasons of more rapid surface run-off and progressively greater filling up of river bottoms.

ANNOUNCEMENT

A meeting of the Officers and Directors of the National Society will be held in Washington late in March or early in April.

Matters not submitted by officers or directors must come through State Societies.

Machine-Made Jobs

"But's" and "And's" that Must be Considered in Connection with Common Statements Which on the Surface Appear to Prove that Machines Cause Unemployment

Reprint from Machinery and Allied Products Institute

Machine-Made Jobs Look at the Automobile Industry

Vast technological improvements have been made in the automobile industry in the last few years which have greatly increased productive capacity of workers in many jobs.

But employment per vehicle in the automobile industry in 1935 was 25 per cent higher than in 1929. This is due to increases in the quality and size of the average motor car which more than counterbalance the savings from new machines and methods.

And automobile production has increased so much that for every 100 workers engaged in automobile manufacturing between 1923 and 1925 there were 109 in 1935.

Steel Passes 1929 Peak

Some of the greatest technological developments in America in recent years have taken place in the iron and steel industry.

But the use of steel in the United States increased from 2,600 pounds per person in 1900 to 16,800 pounds in 1935. There used to be only two or three kinds of steel, but today there are scores of different alloys for different purposes and there has been a vast increase in the number of sizes, finishes and shapes that modern industry demands.

And employment has grown from less than 150,000 sixty years ago to about a half million today, and despite, or because of, the recent technological changes employment in 1936 has passed the 1929 peak. Production is far below capacity and with its inevitable rise employment will go even higher.

What About Printing Machinery?

Type-setting and other printing machines, each of which can do as much work as a large number of men might do by hand, have been installed in printing plants throughout the county.

But printed material has increased in quantity and improved in quality even faster than technological developments have taken place.

And employment in newspaper and periodical publishing today is far greater than it was ten years ago, according to the United States Bureau of Labor Statistics, and there are more than five times as many employed in the printing industry today as in 1890 when almost all work was done by hand.

Good-Bye, "Hello Girls"? No, More of Them Than Ever

Dial telephones increased from 2.7 per cent of the entire Bell system in 1921 to about 32 per cent in 1930.

But telephone calls per month more than doubled between 1921 and 1930.

And telephone operators increased from 190,000 in 1920, according to the United States census, to almost 249,000 in 1930, and telegraph and telephone linemen almost doubled in the same period.

More Ice Dealers

Mechanical refrigerators have displaced the daily visit of the iceman in thousands of American homes.

But the popularization of refrigeration created a demand for ice among thousands of families who had never used it before.

And between 1920 and 1930, according to the United States census, ice dealers increased from 8,000 to more than 19,000.

Both Office Machines and Workers Increase

Business machines, such as typewriters, dictating machines, adding machines, and calculators have revolutionized office work in recent years.

But the office work to be done has increased faster than technological development.

And, according to the United States census stenographers and typists increased from 615,000 in 1920 to 811,000 in 1930; and bookkeepers, cashiers and accountants increased from 735,000 to 931,000. Without the machines much of the work would never be done and thousands of the jobs would not exist.

What About Transportation

Technological developments have revolutionized transportation in recent years, and much railroad service can be rendered today with fewer men than were formerly needed.

But transportation services have been greatly expanded. Airplanes, automobiles, motor buses and motor trucks, all of which have created new jobs, now supplement railroad facilities.

And although railroad employment has dropped about a million workers from the peak reached in 1920, motor transport alone has created vastly more employment than this. In 1935 there were 2,700,000 truck drivers, 153,000 bus drivers, and 301,000 workers were employed in federal and state highway construction and maintenance. The federal census lists transportation and communication together, and in this classification there was an increase of more than 800,000 jobs between 1920 and 1930.

Steam Shovels For Ditch Diggers

Steam shovels do as much work as thousands of men could do in large engineering projects.

But if the work had to be done by hand the cost would be so great that it would never be undertaken. Building construction would be at an even lower level than at present.

And thousands of men now employed on big engineering projects would not have the jobs they now hold. High costs make it impossible for construction work to be undertaken. The principal reason that there has been much less unemployment in the engineering and construction trades in England in the last few years is that costs have been reduced while in America they have been kept up.

Back to the Spinning Wheel?

Women's clothing and other products of the textile industries can be produced with a fraction of the human labor, per garment, that was necessary before modern machinery was developed.

But the modern methods have reduced costs to such an extent that the market for textile products has been greatly multiplied.

And there are almost one-third more workers making women's clothing today than there were ten or twelve years ago, and there are eight workers making men's furnishings for every seven between 1923 and 1925. The National Industrial Conference Board found that employment per unit of production in the textile industries as a whole was higher in January, 1936, than it was in January, 1929. It takes far more workers to furnish the textile demands of a thousand Americans today than it did in the colonial days of the spinning wheel.

No More Theater Orchestras

Machines are even being used to entertain us, and sound pictures displaced 50 per cent of all theater musicians between 1927 and 1930.

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Open Forum

To The Editor:

I want to heartily congratulate you upon the marked improvement and modernization of the AMERICAN ENGINEER. Its outside appearance paper, size and arrangement are all immensely improved, and I feel that the value of this exceptionally valuable instrument of the professional engineer has been multiplied by the change, and I sincerely trust that you will be able to continue its successful enlargement and improvement.

As Chairman of the National Committee on Public Relations, I would suggest changing its name to, THE AMERICAN PROFESSIONAL ENGINEER so as to emphasize its professional distinction from other periodicals known variously as the, *National Engineer, The Operating Engineer, Tool Engineer,* etc., as I feel that "Professional Engineer" should be kept distinctive.

I am enclosing my professional card for inclusion in the Professional Directory of the AMERICAN ENGINEER to go on the "Good Spot" that you have reserved for it.

Yours very sincerely,

HARRY E. HARRIS,

Chairman, National Committee on Public Relations,

President, Connecticut Society of Professional Engineers.

Dear Editor:

In reading the current issue of THE AMERICAN ENGINEER, I noticed the open letter of the Editor, and offer the following statement of the activities of this Reading Chapter feeling they may be of sufficient import to be of interest to the various Pennsylvania Chapters.

I of course offer these subject to your approval as to whether or not you deem them of State wide interest.

At our last Board meeting it was unanimously decided that with the assistance of our Solicitor a letter be drafted and sent to various Engineering concerns so advertising themselves, we felt, illegally.

Am enclosing a copy of the letter so drafted and sent which is self explanatory. These letters were sent by Registered Mail to ten such Concerns and were mailed, February 9th, and to date I have received requests from two recipients of these notices asking information relative to becoming Registered and expressing their desire so to do.

I felt it might be wise for other Chapters throughout the State to be advised thru the medium of THE AMERICAN ENGINEER, just what this Chapter was doing along these lines, and if we meet with any cooperation; of which we have been assured; from the State Authorities and are successful in showing the desired results, the various other State Chapters might wisely follow suit.

Thanking you for a reply and an expression of approval or criticism of our endeavors, I am,

Yours very truly,

B. M. ALEXANDER,

Pres. Reading Chapter of Prof. Engineers.

Dear Editor:

I have asked myself many times what benefit do we derive from being a Registered Professional Engineer. I could find no answer except that I paid a dollar a year for the privilege of carrying a card containing my name and number.

Certainly I was dumbfounded on my return to the States, when I have to acknowledge that the practice of Engineering rather than being considered a profession, was more or less considered as a trade. A locomotive driver was called an "Engineer," a steam shovel operator was called an "Engineer" and often times in meeting some of these men and not knowing the American meaning of the word Engineer I started to discuss some technical features I found that the men to whom I talked were not Engineers as I understood the term and in my estimation could not possibly be, or the American colleges were doing a poor job in training their men. Fortunately enough some of my friends gave me an explanation—any one that operates an engine is called an "Engineer."

I tell you my pride hurts, for in all my travels through Austria, Switzerland and Italy I have always felt proud of being an Engineer and I was accustomed to be addressed as one, but I have resigned myself to new ways. Since those days I have always wished some one would start a movement for the rehabilitation of the profession, because sure enough there were others who felt as I did, and fortunately, a National Society for Professional Engineers was born.

Men of National reputation took the helm of the movement, professors and others joined to form a nucleus of active workers who were rightfully proud of their chosen profession. The public in general does not realize the work done by the Engineer; furthermore Engineers have an over-developed sense of modesty; but monuments such as the San Francisco-Oakland Bay Bridge, Golden Gate Bridge, Boulder Dam, Panama Canal, etc., are our monuments; the wonderful machines of this age are due to Engineers, the majestic liners, aeroplanes and other hundreds of things of which we read in the daily news, are the work of Engineers—still all of this is taken for granted.

European countries are aware of the responsibilities given to Engineers in the development of the general welfare and accordingly recognize it by honoring those men and giving them social and economic standing inferior to none.

The preamble of the Constitution of our National Society reads:

> "Recognizing the service to Society, to State and to profession, is the premise upon which individual opportunity must be builded, the National Society of Professional Engineers does herewith dedicate itself to the promotion and protection of the Profession of Engineering as a social and economic influence vital to the affairs of men of these United States."

Let all Engineers realize fully these words—let us all unite in a common purpose—let us forget personal animosity, politics, and make a success of our profession as much as we want to make a success in our chosen work.

Join your local Chapter—be active—shake off that apathy. Do your bit for yourself and for all.

ENGINEER DAVID CAMILLI.
Pittsburgh, Pa.

To The Editor:

The new issue of THE AMERICAN ENGINEER for the month of January, 1937, is certainly a decided improvement over the previous issues. The physical set-up of the magazine is excellent as well as the articles and text.

I think the magazine could be improved considerably if more news items are included in the future. By that, I mean news of State societies and local chapters.

Yours very truly,

ENG. GEORGE U. DALUN.
New York City.

Dear Editor:

Congratulations on your January issue of the AMERICAN ENGINEER.

The cover idea is fine and as a whole, you have put snap and attention value in the

contents. I like the use of photographs of current interest. It seems that editorial comment might have been made about the Court.

The page devoted to Current Opinion About The Engineer should aid in making members more socially minded and result in better appreciation of the relation of the engineer to world affairs. The subject matter might even be expanded to include any items which should have the attention of engineers.

I am inclined to think that the composition of pages 4 and 5 could be improved. This spread seems to have too many boxes and lines and too many different column widths. I also wonder if the poem on page 14 gives the conception of the engineer which we want people to have. My opinion is that it does not and I regret that it was given space. Kipling's *Sons of Martha* is to my mind the best poetic conception of the engineer that I have ever read.

Inasmuch as legislative interest and activities are very much associated with the National and State Societies, the consolidation of Federal legislation notes with National Society news and State legislation notes with State Society news might be considered.

I never could understand the connection between that bird sitting on the North Pole and the AMERICAN ENGINEER. As far as the cover is concerned, I think it would be improved by leaving off the embellishments at the left and right of the title.

Very truly yours,

HAROLD R. TOWSE.
115 Hamilton St.,
Rockville Center, N. Y.

To The Editor:

The format of the January number of the AMERICAN ENGINEER is so striking that you should be complimented upon the edition. Of course, the aluminum ink on the cover is, in itself, very striking, but the photographs combined on the front cover are not only excellent, but very timely.

With kindest personal regards and best wishes for your continued success in the editorial Chair,

Sincerely,

H. COMER WOLF.
Irvine, Kentucky.

To The Editor:

I have been negligent in extending to you my personal congratulations and extending our appreciation for your kind service to the engineering profession on becoming editor of the American Engineer.

The kind things I have heard about you prompts me to predict that you will have a successful and enjoyable administration.

I am inclosing some data relative to the annual convention of the Ohio Society of Professional Engineers which may be worthy of a place in your columns.

With all good wishes, I am
Cordially and sincerely yours,

PERRY T. FORD, *President,*
Ohio Society of Professional Engineers.

Dear Editor:

We in Connecticut fully realize that you have undertaken a large and one of the most important jobs in the National Society. The AMERICAN ENGINEER is undoubtedly the largest single factor in the important and necessary work of building up our membership.

I am enclosing an abbreviated report from the Minutes of the Board of Directors' Meeting of the *Connecticut Society of Professional Engineers* of January 11th, also copies of my letters of this date to Secretary Harkness of the Bridgeport Chapter and Secretary Borggrafe of the Stamford Chapter. I am sure that we can count on their cooperation.

I will endeavor to see that you get information such as you have enumerated, from 1 to 7, in your letter, as fast as it is available.

Your letter will be read at the next meeting and we hope to have also, your circular letter upon advertising to read at that time.

Should you wish to address the *Connecticut Society of Professional Engineers* at one of its meetings upon the subject of the AMERICAN ENGINEER, we would be glad to make arrangements to give you this opportunity, and feel that such a talk would have much to do with increasing local interest in the meeting.

Yours very truly,

CARL GOTTHARDT, *Secretary,*
Connecticut Society of Professional Engineers.

February 25, 1937.

Dear Editor:

The writer contributed an article in the November last issue and also attempted to get some ads for the issue. If Engr. Bolan is interested I will send him my correspondence with various firms so that he might pick up where I left off. At that time the National Office was too busy and the attempt at that time was only an encumbrance. Now that this phase of the paper has been detached from the duties of that office better attention can be given it.

You asked what would I do if I were editor. As a former newspaper man I know the amount of work entailed in getting out a publication not to say the difficulty of change of administration causes etc. I will give you my ideas for what they are worth. I will set them up in the order of prominence.

Method of setting up a technical and editorial organization:

1. Make a general appeal to the readers for contribution of articles dealing with the welfare of engineers or of general interest to engineers. This would not only indicate where the literary talent was within the organization but would furnish a reservoir of copy for future issues when current material is scarce. It would furnish a list of on-call writers who could be asked from time to time to write special articles. It would indicate the workers.

2. Set up Temporary Organization.

a. Appoint Associate Editors from among the above contributors preferably since they have indicated their willingness to work. They would receive and edit General and Special Articles. News clippings sent in from Chapter Secretaries along with the Chapter's activity report. Legislative work etc.

b. Regional Associates: Duties to compile news items concerning a section; example New England States.

c. Advertising Manager: Duties to contact firms for "ads".

1. Assistants.

2. Assistants: Duties to obtain "ads" on a commission basis.

3. Permanent Organization:

A. Appointment of Assistant Editor

B. Appointment of Associate Editors

C. Appointment of Advertising Manager

D. Obtain the services of a feature writer on a salary basis when receipts of "ads" warrants same.

4. Permanent Organization on a Full time Salary Basis: All depending upon the success of the Advertising Section's ability to sell the AMERICAN ENGINEER as a good advertising medium. A virgin field for advertisers.

Above is a resume of how I would go about setting the organization up if I were detailed to the job. That is in general. Circumstances will crop up which will change your whole original idea.

In any case I would insure myself with an abundance of material by a general call for articles before I had to scrape around for news.

I suggest that clippings which might be interesting to engineers or which might furnish material for editorials should be collected by the chapter secretaries and sent in. With this same thought in mind I am enclosing a number which may be useful.

As to the composition of the AMERICAN ENGINEER. I think you did a swell job of it. I feel that sections should include those of General Articles, Promotional Activities in New States, Chapter and State News, also a section dealing with Legislative Activities. Your front page was excellent. I suggest that the Capitol be kept as the general motif just as you did in the January issue and then superinpose something of current interest.

Suggest that President Sheridan write a detailed report of and encouraging progress in the matter of new state societies. It would be interesting reading.

Hoping that the above is of interest to you, as are the enclosed clippings, (I would be very much pleased to learn whether Engr. Bolan would like my file on Advertising) and wishing you huge success, I am

Very truly yours,

JOHN B. WALSH,
Member Public Relation's Committee NSPE
Member N. Y. County Chapter.

Editor's Note: These suggestions will be considered by National Directors—We think your ideas are excellent—Please send along your advertising file.

State Conventions

Ohio Society

PROGRAM
of the
Fifty-Eighth Annual Meeting
of
OHIO SOCIETY OF PROFESSIONAL ENGINEERS
formerly
OHIO ENGINEERING SOCIETY
Affiliated with the National Society of Professional Engineers
February 11-12-13, 1937
Deshler-Wallick Hotel
Columbus, Ohio

FIFTY-EIGHTH ANNUAL MEETING
OHIO SOCIETY OF PROFESSIONAL ENGINEERS

PROGRAM
Thursday, February 11

Registration Members and Guests—Applications New Members, etc.
General Arrangements—Group Meeting Assignments and Luncheons—In charge of Reception Committee, Fred Swineford, Chairman.

Opening Session

All Members and Guests Requested to be Present.
Perry T. Ford, President, presiding.
Welcome to Columbus—Hon. Myron B. Gessaman, Mayor of Columbus, Ohio.
Response—Frank L. Raschig, Cincinnati, O.
Words of Greeting—Hon. Martin L. Davey, Governor of Ohio.
Response—W. H. Dittoe, President, Mahoning Valley Society of Professional Engineers, Youngstown, Ohio.
Address—Hon. John Jaster, Jr., Director of Highways of Ohio.
Public Works Administration Activities—Hon. Horatio B. Hackett, Assistant Administrator, Washington, D. C.
Introduction by L. A. Boulay, Chief Engineer Public Works Administration for Ohio.
Ohio Highway Planning Survey—Col. D. F. Pancoast, Manager for Ohio.
Introduction by Walter W. Graf, Secretary Ohio Survey Committee.
The San Francisco-Oakland Bridge—Moving Pictures and Descriptive Remarks.

Business Session
Saturday, February 13

J. R. Burkey, Vice-President, presiding.
President's Annual Report—Perry T. Ford, President O. S. P. E.
Secretary's Annual Report—John Laylin, Executive Secretary.
Report of Tellers—Result of Letter Ballot.
Reports of Committees.
Unfinished Business.
Installation of Officers for the Ensuing Year.
Adjournment.

OFFICERS

Perry T. Ford .....President
Wyandotte Building, Columbus, Ohio
J. R. Burkey .....Vice-President
State Office Building, Columbus, Ohio
Edward G. Cantwell .....Vice-President
285 Cozzens St., Columbus, Ohio
John Laylin .....Executive Secretary
Rm-78 Neil House, Columbus, Ohio

TRUSTEES AND EXECUTIVE COMMITTEE

Wade W. Shidler .....Alliance, Ohio
John Jaster, Jr. .....Columbus, Ohio
State Office Building
L. A. Boulay .....Columbus, Ohio
New P. O. Building
Wm. F. Schepflin .....Fremont, Ohio
Harold L. Hubbell .....Kent, Ohio

BOARD OF DIRECTION—DELEGATES OF AFFILIATED SOCIETIES

Hal G. Sours .....Akron
Homer E. Anderson .....Alliance
Walter W. Graf .....Lancaster
E. A. Munyan .....Cincinnati
Wendell P. Brown .....Cleveland
Fred J. Cellarius .....Dayton
Granville E. Scott .....Norwalk
B. E. McCown .....Ironton
H. J. Ong .....Athens
W. H. Dittoe .....Youngstown
H. D. Schoonover .....Mt. Gilead
C. Raymond Hanes .....Lima
Oscar F. Schilling .....Sidney
Carl J. Knicely .....Marietta
Paul E. Glasgow .....Wooster
E. N. Luce .....Jefferson
Dr. Thos. J. Smull .....Ada
G. F. McKinney .....Portsmouth
A. P. Cooper .....Georgetown
Wm. F. Schepflin .....Fremont
Michael J. Bahin .....Springfield
Robert A. Carnahan .....Steubenville
C. C. Reimer .....Middletown
Carleton S. Finkbeiner .....Toledo
C. M. Sprague .....Zanesville
C. C. Lattimer .....Columbus

LEGISLATIVE COMMITTEE

Edward G. Cantwell, Chairman ..Columbus
John O. McWilliams .....Cleveland
W. Allen Stone .....Cincinnati
Ben G. Kesting .....Toledo
Curtis C. Lattimer .....Columbus
Victor C. Smith .....Dayton
Hal G. Sours .....Akron
Wade W. Shidler .....Alliance
Hon. John T. Hewitt .....Youngstown
G. F. McKinney .....Portsmouth
M. J. Bahin .....Springfield
Walter W. Graf .....Lancaster
C. W. Stacy .....Marietta
Pierre V. Coppess .....Greenville
Cecil R. Leavens .....Delaware

ENTERTAINMENT COMMITTEE

Arch F. Unckrich, Chairman ....Columbus
Carl G. Wahl .....Columbus
Paul W. Maetzel .....Columbus

RECEPTION COMMITTEE

Fred Swineford, Chairman .....Columbus
Guy F. Atkins .....Columbus
Cecil R. Leavens .....Delaware
Edwin R. Burke .....Springfield
George F. Baker .....Dayton
Walter E. Willard .....Middletown
Harry C. Nutting .....Cincinnati
Henry K. Martin .....Portsmouth
Cecil E. Bales .....Ironton
Howard D. Herbst .....Steubenville
Ed. D. Haseltine .....Youngstown
Luther K. Zerbe .....Canton
James E. Fox .....Wooster
Ivan R. Ault .....Ashland
Judge Harlan Sperry .....Chardon
D. R. Terrill .....Berea
Edgar Job .....Lorain
Geo. M. Lieber .....Fremont
Guy W. Ellis .....Marietta
E. N. Leonard .....Gallipolis
J. W. Wilson .....Athens
Addison C. Murphy .....St. Clairsville
John W. Alter .....Zanesville
Chas. H. Wells .....Newark
Fred L. Biecele .....Columbus
Harry Sharp .....New Philadelphia
Alex S. Forster .....Toledo
Frank A. Daum .....Defiance
Walter J. Neidhardt .....Lima
W. Earl Ulrich .....Findlay
Ralph S. Williams .....Columbus
Wm. S. Dun .....Columbus
Ralph C. Watts .....Columbus

New Jersey Society

The New Jersey Association of Professional Engineers and Land Surveyors held their seventeenth annual convention at the Hotel Alexander Hamilton, Paterson, New Jersey, on Saturday, January 16.

New officers elected were: Beale M. Schmucker, President; Gerald W. Knight, First Vice-President; Victor C. Gelineau, Second Vice-President; and Ernest F. Weeks, Secretary-Treasurer.

The convention program included business sessions and committee reports, an extensive exhibit, and an inspection trip to the Passaic, Valley Water Commission Filtration Plant at Little Falls and the Hydro-Electric Plant of the S. U. M. at the Passaic Falls, Paterson, N. J.

In the evening there was a dinner and dance for members, ladies and guests, with Dr. Harvey N. Davis, President of Stevens Institute of Technology as the principal speaker.

The convention committee included the following:

Vincent J. Scanlan, Chairman, Engineering Supervisor W. P. A., Paterson, N. J.; Otto Reiner, Division Engineer, Gas Dept., Public Service Electric & Gas Co., Paterson, N. J.; Fred W. Loede, Engineer, Passaic County Park Commission, Paterson, N. J.; Clarence Briggs, County Supervisor, Coast & Geodetic Survey, Hawthorne, N. J.; Russell S. Wise, Engineer, Passaic Valley Water Commission, Paterson, N. J.; William H. Floyd, Assistant County Engineer, Passaic County, Paterson, N. J.; Ernest F. Weeks, Supt., Paterson Gas Works, Public Service Electric & Gas Company, Paterson, N. J.; George Hewitt, County Engineer, Passaic County, Paterson, N. J.; Fred J. Wright, Engineer and Contractor, Hawthorne, N. J.; L. Martin Harris, Supt. of Distribution, Gas Dept., Public Service Electric & Gas Co., Paterson, N. J.

Report and Recommendations of State Ethics Committee

1. During the year only one complaint was brought to the attention of your committee, which upon discussion at a meeting was not considered to belong in the field of action of this committee. The fact that no cases of unethical practice were brought before the committee is thought to be due to lack of

(1) effective channels through which complaints can be received and investigated.
(2) absence of a code of ethics specifically for the state society, and
(3) inadequate publicity.

Your committee recommends that:

(1) The President of each Chapter be required to appoint a carefully chosen committee of three members of their chapter to which local complaints be addressed. This

(Continued on page 27)

FROM THE CONNECTICUT SOCIETY

THE NATIONAL ENGINEERING COMMITTEE ON FLOOD CONTROL AND SOIL CONSERVATION

Professional Engineers know that an extensive program such as Flood Control, to be successful, must be carefully planned, and as carefully carried out in proper, balanced sequence.

The Connecticut Society of Professional Engineers foreseeing the confusion which has followed the recent floods and realizing the responsibility of the engineer in the matter, unanimously adopted the following resolution at its annual meeting last year.

This Resolution has been endorsed by the State Professional Engineering Societies, and the National Committee was formed from their representatives. Engr. Harry E. Harris, President of the Connecticut Society, who has taken a leading part in the matter was elected Chairman of this Committee.

RESOLUTION ON FLOOD CONTROL

WHEREAS, the appalling loss of life, health, property and injury to the economic welfare of the nation and its people from the preventable devastation caused by uncontrolled flood conditions throughout the land can repeatedly occur with progressive aggravation under the present condition of our natural water sheds; and

WHEREAS, the magnitude of the present national calamity is principally due to the non-correlated and fragmentary though extensive expansion of civilization and industry, and the growth of the urban population, attended by the denudation of forest land, the filling in and diversion of tributary streams, weak dams, both large and small, the decay of old mill dams that are no longer in use, insecure and low bridges, the lack of dikes at narrow channels, the absence of planned reservoir basins, and so forth; and covering each drainage area a proper system of dams,

WHEREAS, by comprehensive engineering planning dikes, embankments, control reservoirs, lakes and ponds, ice breakers and deflectors, channels, levees relief gates and ice destruction high and safe bridges, reforestation, etc., can be laid down that will not only prevent recurrences of flood calamities, but will cost less than the effort of a single recurrence, and furthermore will produce a collection of most valuable future assets; namely, (1) an augmented water supply now needed by our increasing population; (2) the prevention of the erosion and washing out of millions of tons of irreplacable fertile and fertilized agrarian soil; (3) provision for the propagation of food fish; (4) supply of power at well distributed locations; (5) soil moisture retention for agriculture; (6) healthful recreation sites in waste lands; (7) beautiful scenery; (8) control of water pollution; (9) contribution of many contingent benefits for the peoples of our growing civilization; and

WHEREAS, the probable hurried and improperly planned restoration of the devasted area will increase future dangers and waste billions;

THEREFORE BE IT RESOLVED:

That THE CONNECTICUT SOCIETY OF PROFESSIONAL ENGINEERS does hereby urge and demand (1) that the several state governments and the Federal government combine to set up a UNIFIED ENGINEERING CONTROL for each drainage area, each reporting to a CENTRAL COORDINATION ENGINEERING AUTHORITY; (2) that funds be appropriated by Legislatures and the Congress for surveys extended to all tributary stream sources throughout the entire flood area by corps of qualified engineers; (3) that funds be appropriated by Legislatures and the Congress for the achievement of scientific flood control with attendant conservation planned and executed by fully qualified engineers; (4) that the selection of all executive and assistant engineers on the projects be non-partisan and free from political preferment, and that such selection be made entirely upon the basis of character, engineering ability and reputation.

FURTHERMORE, BE IT RESOLVED:

That every professional engineer in the country, every engineering organization in the land, be urged to use their individual and vast collective power to see that the objects of this RESOLUTION are accomplished; that friendly effort and argument, political pressure and publicity be brought to bear by them for the attainment of this end, thus performing an enlightening service of inestimable value to our country.

AND FURTHERMORE BE IT RESOLVED:

That a copy of this RESOLUTION be sent to the President of the United States of America, to the Governor of Connecticut, to the National Society of Professional Engineers and all other State Societies of Professional Engineers, to the AMERICAN ENGINEER and to other engineering organizations of the United States of America, to the Associated Press, to the United Press, to the newspapers of Connecticut, to the United States District Engineer and such others as the Executive Committee deems advisable, with a letter from our President urging their non-partisan support and endorsement of this RESOLUTION.

Unanimously approved by the CONNECTICUT SOCIETY OF PROFESSIONAL ENGINEERS, Inc., in convention assembled, at Bridgeport, Conn., on March 28, 1936.

This resolution has met with wide approbation from Administrators, Senators, Representatives and Committees in Washington, from the press, from leading editors, from other Engineering Societies, from organized Agriculture, from Governors, State Senators and Representatives, from leading hydraulic engineers and hydrologists, and from many others.

Thousands of copies of this resolution have thus been distributed by mail and by publication, to legislators, governors, engineering organization, civic bodies, regional planners, etc. The endeavor is still in its early stages and is expanding through the efforts of the Professional Engineering Societies in the different States.

OHIO

RESOLUTIONS ADOPTED BY OHIO SOCIETY OF PROFESSIONAL ENGINEERS IN ANNUAL CONVENTION ASSEMBLED AT COLUMBUS, OHIO, FEB. 13, 1937.

RESOLUTION—Endorsing the Proposed Establishment of a department af Public Works for the Executive Branch of the Federal Government.

WHEREAS, the President of the United States has recommended to the Congress that a Department of Public Works in the Executive Branch of the Federal Government be established, with a Secretary of Public Works in the President's Cabinet, and

WHEREAS, such a Department has been recommended for many years by national oraganizations and persons of prominence, and

WHEREAS, we believe that such a Department is most decidedly in the public interest, now, therefore,

BE IT RESOLVED by Ohio Society of Professional Engineers that the establishment of a National Department of Public Works be heartily endorsed, and that it be recommended that the same be headed by a Registered Professional Engineer, and

BE IT FURTHER RESOLVED, that the Secretary of Ohio Society of Professional Engineers transmit a copy of this Resolution to the President of the United States and to members of the Congress for the State of Ohio.

RESOLUTION—Calling upon the Executive Branch of the Federal Government to Employ Professional Engineers for Flood Prevention Work.

WHEREAS, a flood of major proportions is being experienced in the Ohio and Mississippi Valleys with attendant deplorable loss of life and property, and

WHEREAS, the Federal Government is rightly considering the erecting of an agency to formulate plans and execute such measures as will prevent the recurrence of such catastrophies, and

WHEREAS, such an undertaking is essentially technical in its nature, and its manner of prosecution and its ultimate success are of vital importance to public welfare, now, therefore,

BE IT RESOLVED that Ohio Society of Professional Engineers respectfully requests the Federal Government to employ Registered Professional Engineers in all positions on such work for which engineering training is pre requisite, and

BE IT FURTHER RESOLVED, that the Secretary of Ohio Society of Professional Engineers transmit a copy of this Resolution to the President of the United States and to members of the Congress for the State of Ohio.

RESOLUTION—Endorsing in Principle the Secrest Bill Introduced in the House of Representatives of the Congress of the United States.

WHEREAS, the recent flood of the Ohio River and its tributaries has taken many lives and damaged property and transportation facilities to the extent of many millions of dollars, and

WHEREAS, the feasibility of the control of flood waters has been proven by the Miami Conservancy District, and the Muskingum Watershed Conservancy District in so far as completed, now, therefore,

BE IT RESOLVED that Ohio Society of Professional Engineers hereby endorses the Secrest Bill in principle in creating or otherwise advancing work on the Scioto Valley Conservancy District and introduced in the House of Representatives of the Congress of the United States by Representatives Secrest of Zanesville, Ohio, and

BE IT FURTHER RESOLVED, that the Secretary of Ohio Society of Professional Engineers transmit a copy of this Resolution to the President of the United States and to members of the Congress for the State of Ohio.

RESOLUTION—Relating to the Practice of Engineering by Landscape Architects.

WHEREAS, it has been called to the attention of this organization that Landscape Architects are preparing plans for water supply and sewers being built for parks and other public or semi-public projects under State supervision, and

WHEREAS, many of these Landscape Architects are not Registered Professional Engineers, now, therefore,

BE IT RESOLVED that Ohio Society of Professional Engineers request the Ohio State Department of Health that it approve only plans for such work as are prepared or submitted by qualified Professional Engineers, and

BE IT FURTHER RESOLVED, that the Secretary of Ohio Society of Professional Engineers be directed to transmit a copy of this Resolution to the State Director of Health of Ohio.

RESOLUTION—Condemning the Practice of Free Engineering Service.

WHEREAS, the practice of certain manufacturing companies, sales organizations and contractors offering free engineering services to the purchaser, client or public has become increasingly prevalent, and

WHEREAS, such practice is detrimental to all concerned and tends to destroy competitive bidding, now, therefore,

BE IT RESOLVED that Ohio Society of Professional Engineers condemns such offering or furnishing of free engineering services, and

BE IT FURTHER RESOLVED, that the evidences of such practice be considered by the local societies of professional engineers for proper action.

RESOLUTION

Calling the attention of the Presidents and Boards of Trustees of universities and colleges in Ohio to the outside professional activities engaged in by members of the faculties of their institutions and urging them to prohibit their faculty members from engaging in such professional activities at fees below the recognized professional standards as adopted by Ohio Society of Professional Engineers.

WHEREAS, instances have occurred wherein members of the faculties of universities and colleges have been employed in private engineering practices, without fees, or at less than the recognized schedule of fees, and

WHEREAS, material harm is done to the engineering profession by such practice, and

WHEREAS, this Resolution is not directed against tests, reports, investigation, and/or research which lead to the extension of knowledge, which activities this Society commends and endorses for the reason that we believe teachers of engineering should be expected to keep their professional skill and experience; but professional service without pay or at fees lower than the Ohio Society of Professional Engineers' standard, damages the whole profession and is objectionable, and

WHEREAS, definite action concerning outside practice by university or college faculty members is not without precedent, (attached hereto are excerpts from the University of California Faculty Bulletin of December 15, 1934, and policies and regulations of Case School of Applied Science dated April 24, 1935, which prohibit such practices as are covered by this Resolution), and

WHEREAS, the objection of the Professional Engineers to such practices is that it is unethical that an institution engaged in the work of preparing men for the practice of engineering allow itself to compete or its faculty members to compete unfairly with the men it has so trained, or as employers maintaining offices and organizations necessary to serve the public according to recognized standards of present day specialized professional practice, now, therefore,

BE IT RESOLVED, that Ohio Society of Professional Engineers does hereby condemn such unfair practices, and

BE IT FURTHER RESOLVED, that this Resolution be transmitted to the Presidents and Boards of Trustees of universities and colleges in Ohio for consideration, and for such action as they may deem desirable for the benefit of the engineering profession, and the safeguarding of the interests of the universities and colleges.

MISSOURI

NEW MISSOURI STATE SOCIETY WINS APPLAUSE

Echoes of the action of the Missouri Society of Professional Engineers in forming a State Society affiliated with the National Society of Professional Engineers as reported on the 1st page, 1st column of *The Rolla New Era* have been heard all over the country. This article was telegraphed, read and greeted with applause and cheers by the New Jersey Association of Professional Engineers and Land Surveyors at their seventeenth annual meeting and convention, over 500 strong, at the Hotel Alexander Hamilton in Paterson, New Jersey on January 16, 1937.

Similar action was taken by the Connecticut Society of Professional Engineers at their meeting in Bridgeport, Conn., on January 18th.

The New York State Society of Professional Engineers has since taken similar action and copies of the *New Era* article have been forwarded to all the other state societies of professional engineers. Greetings and congratulations are being sent to Dr. C. E. Bardsley of the School of Mines and his associates in this splendid action in advancing the status of the profession and their opportunities to properly serve the nation and its people. The 38 states who already have laws properly functioning to protect the public from incompetent and unethical practitioners claiming to be engineers hope that the Missouri Legislature will enact suitable engineering control laws to similarly protect her citizens.

It is hoped that the Missouri citizens, engineers and legislators will support such legislation to a man and that every truly ethical and qualified professional engineer will join the Missouri Society of Professional Engineers to advance this ethical movement, and the other aims and objectives of the Society, as its importance cannot be over-estimated.

The Professional Engineers throughout the country are sponsoring and backing besides improved laws, such matters as Flood Control, Soil Conservation, enlarged College Curricula, Higher requirements for entrance and graduation, law enforcement, safety regulations, proper support of the State Land Grant Colleges, and the like.

HARRY E. HARRIS, *Chairman*
Public Relations Committee
National Society of Professional Engineers
National Press Building,
Washington, D. C.

NEW YORK

Albany County Chapter

The following were elected as officers of the Chapter for 1937:

President, Herman F. Lame, 352 State St., Albany; Vice-President, C. George Gardner, 63 Academy Rd., Albany; Secretary, Walter C. Benedict, 28 Cleveland Ave., Albany; Treasurer, Wm. J. Blaum, 54 Ramsey Pl., Albany; Director, Clarence W. Post, 1 Columbia Pl., Albany; Director, Arthur W. Brandt, 363 Morris St., Albany.

Messrs. George A. Teeling, 11 North Pearl St., Albany and Louis C. Hyatt, 38 S. Pine Ave., Albany retain their posts as Directors for another year.

S. D. HARVITH,
418 Hudson Ave., Albany, N. Y.

Nassau County Chapter

At the annual meeting of the Nassau County Chapter held at the Court View Hotel, Mineola, Thursday evening, December 3rd, the following officers were elected for the year 1937.

President, Frederick W. Malkmus, Box 275, Carle Place, N. Y.; Vice-President, Simon E. Hunt, 176 Roslyn Road, Mineola, L. I.; Secretary—Frederic J. Buse, Westbury Ave., Carle Place, N. Y.; Treasurer, Charles H. Weckerle, Spruce St., New Hyde Park, N. Y.; Directors for 3 year terms, John J. Fitzgerald, Jr., 144 Parsons Dr., Hempstead, L. I.; Franklin W. Saunderson, 320 Pacific St., Cedarhurst, L. I.; Henry Waldinger, 57 So. Cottage St., Valley Stream, N. Y.

The officers were installed by Past President Harold C. Stevens.

Under new business Eng. J. C. Guibert, Chief Engineer of Nassau County, cited several cases where School Boards and Municipalities in hiring a so called "clerk of the works" or inspector failed to do themselves justice by appointing men who by training were not competent enough to safeguard their interests.

The new President appointed Engr. Waldinger, Valley Stream, who is Mayor of one of the larger Villages of Nassau County, as Chairman of a Committee whose purpose will be to suggest to all School Boards and Municipalities the advisability of hiring Professional Engineers to assure themselves of proper inspection.

Westchester County

The next meeting of the Chapter will be held in conjunction with the Board of Directors meeting. It is to be held in the Elks Club at 5:30 P. M. on the evening of the annual dinner, Monday, February 8, 1937. Important business must be transacted and will include the nomination of candidates for four three-year terms as director. The incumbents are Howard Barnes, Ray Potter, Jim Duffy and Ben Krey. According to the Constitution, eight candidates must be named. A good turnout is expected, as it will present an opportunity to get a head start and a front seat for the dinner.

Attendance prize $7. You must be at the 5:30 meeting to collect.

Latest Meeting

Another excellent meeting. Hugh Robertson gave an interesting, splendid talk on the newspaper game.

The attendance prize $5 was won and lost by Judson A. Doolittle of Mt. Vernon, who was absent. The money goes over to the next meeting.

New members, Wyckoff and Durkee, were present. Also Bill Schneider, and Max Vogel of the old guard. Lots of familiar faces were missing—Andy Nick, Penna, Malcolm, Les Holleran, Geo. MacBeth, Harold Watt, etc.

The membership contest moves merrily on. Dave Thompson of the County Engineer's office is the latest addition. Let's go! How about a few more members? There are still some 700 eligible non-members. HOW ABOUT IT? Let every member get one new member in February. Write to the secretary if you don't have a prospect. The State Legislative Program needs backing!

The Dinner

No question about it, the annual dinner is expected to pack the Elks Club. John Avery has had 2,000 tickets printed. When you get this bulletin and if you have not paid for your ticket, get John on the 'phone, Nepperhan, 1437, or see Ollie Collins on the fifth floor, County Office Building, for one. Don't miss it. Don't forget—a six course dinner, entertainment, refreshments, an opportunity to meet your fellow engineers, etc. The Time: 7 P. M. The Place: Elks Club, White Plains, N. Y. The Price: $1.50. This is the LAST CALL!

News

The engineering news notes published last month have been well received. The continued cooperation of the members is asked.

The newer members, Van Tassel, Durkee and Wyckoff, are showing an interest in society affairs that should shame some of the boys who haven't helped carry the load.

Frank MacLeay has concluded his classes. Seventeen prospective engineers were members of the class and when they receive their licenses, automatically become members of the State, National and County Societies. $170 was turned into the treasury. This seems to be an easy way to get members.

Engineering News

The plan to build a highway bridge between Tarrytown and Nyack has been abandoned due to excessive costs. Prospective estimated daily income of $1500 would not justify an expenditure of more than $9,000,000. Stable foundations could not be obtained even at a depth of 200 feet. If a stable foundation for the main piers of the proposed bridge could be found somewhere between 80 and 100 feet below water level, the bridge could be built for not to exceed $9,000,000, and would be self-supporting.

* * *

Three villages in Westchester County operate under a modified village manager plan. These are Scarsdale, Larchmont, and Hastings. In Scarsdale, Arthur Boniface, former director is Village Manager in effect; though his title is Village Engineer. A somewhat similar state of affairs prevails in Larchmont, where Arthur Richard is Village Engineer. In Hastings, John G. White serves as Village Clerk-Treasurer. Mamaroneck is the only village in the county with an official village manager form of government. The village manager here is R. J. Whitney.

* * *

Columbia College is to include a two year sequence in the humanities, revising the language and writing requirement and dropping freshman English. This is in line with the resolution adopted by the National Society.

* * *

O. K. Meyers is division engineer for the Fishkill section of the Delaware aqueduct project. Preliminary surveys are under way. Dravo Corporation is low bidder on the first contract for the sinking of shafts between West Branch Reservoir and Hillview and between Rondout and West Branch.

* * *

Eight new construction projects costing nearly three million dollars were included in a recent PWA allotment list. Included were: 1. An office building in the Town of New Castle. 2. A school building for Mt. Vernon. 3. Waterworks for Peekskill. 4. Two schools in Greenburgh. 5. Bridge in New Rochelle. 6. Sewer extensions in New York. 7. School alteration in Hartsdale and 8. A school in Mamaroneck.

* * *

A resolution recently received from Supervisor V. J. Attisani of New Rochelle by the Board of Supervisors was referred to the Budget Committee and the special committee on government reorganization. The resolution urged the formation of a County Planning Board.

* * *

The Civil Service Association of the State of New York and the Civil Service Forum plan to sponsor a bill prohibiting the Civil Service Commission from setting age limitation requirements for the purpose of competing in a competitive examination.

Coming N. Y. City Tests

Engineer (specifications) Grade 4, Dept. of Purchase; Assistant Electrical Engineer Grade 4; Sanitary Inspector; Architectural Design Grade 4; Mechanical Engineer, Grade 4; Assistant Engineer (designer) Grade 4 and pile driving engineer. Further details, watch the New York papers, *The Chief, City Record* or *Times*.

FRANCIS J. LAVERTY,
Secretary.

OKLAHOMA

Oklahoma Society Elects Officers

W. Claude Sale, Oklahoma State Highway Commission, Oklahoma City, was elected president of the Oklahoma Society of Professional Engineers at the annual meeting of the Society held last month. Other officers elected were: C. H. Guernsey, Consulting Engineer of Cherokee, Okla., First Vice-President; George G. Toler, Consulting Engineer, of Ada, Okla., Second Vice-President; E. C. Baker, Stillwater, Okla., Treasurer; Clarel B. Mapes, Tulsa, Okla., National Director; and C. A. Lashbrook, Oklahoma City, Okla., Secretary.

Arthur V. Sheridan, President of the National Society of Professional Engineers, was guest of honor during the Convention and for the banquet in the evening. It was estimated that 250 Engineers attended the sessions.

PENNSYLVANIA

Proposed Act

Prohibiting State and local governmental officers, agents and agencies from accepting, filing or approving certain plans and specifications for buildings, works and improvements, and from issuing or granting permits pursuant thereto.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That it shall be unlawful for any administrative or executive department, independent or departmental administrative board or commission, officer or agent of the State Government, or for any department, bureau, board, commission, officer or agent of any political subdivision of the Commonwealth or any person whatsoever to accept or file or approve any plans and specifications for any buildings, works or improvements in this Commonwealth, or to issue or grant any permit pursuant thereto, unless said plans and specifications are signed by a person legally qualified to prepare plans and specifications for buildings, works and improvements under the laws of this Commonwealth. Any acceptance, filing and approving of plans and specifications for buildings, works or improvements or the issuing or granting of any permit contrary to this act shall be void.

Section 2. All acts or parts of acts inconsistent herewith are hereby repealed.

Pittsburgh Notes

On Thursday evening, January 21st the Pittsburgh Chapter Society of Professional Engineers listened to an instructive talk on the work of the State Board by Engineer John Farris, member State Board for the Registration of Professional Engineers. There was a good turn out. All the engineers present had an opportunity to personally talk with Engineer Farris.

The Pittsburgh Chapter is starting a campaign aimed to unite all the engineers of the district in one professional organization. Twenty-one sub-committees have been appointed under the leadership of Chapter President Engineer Hutchinson and Membership Committee Chairman Engineer Camilli. The committees will contact every engineer in the district within the next year.

The membership drive is off to a fine start. The following engineers have joined the chapter during the past two weeks:

Norman A. Abel, C. F. Abel, Ragner Berg, O. H. Chambers, John J. Croak, James S. Devlin, H. C. Hanson, C. F. Houlihan, Alva Larson, Park H. Martin, R. L. Horne, T. J. Mitchell, E. O. Reed, E. L. Schmidt, H. H. Rankin.

Among the out-of-town engineers present at the recent chapter meeting were Engineer E. F. McManus, Columbus, Ohio, Engineer H. A. Thompson, Drexel Hill, Pa. and Engineer H. M. Day, Canonsburg, Pa.

The following committee chairmen and vice-chairmen have been named for the 1937 term:

Administrative Sub-committees:

Ways and Means Sub-committee—Eng. Daniel E. Davis, Chairman, 313 Clark Bldg., Pittsburgh.

Internal Affairs Sub-committee—Eng. Milton Duff, Chairman, 2227 Jane St., Pittsburgh.

Foreign Affairs Sub-committee—Eng. Ed J. Ducey, Chairman, 618 Harbaugh St., Sewickley, Pa.

Ethics and Practice Committee—E. L. Schmidt, Chairman; Richard Irvin, Vice-chairman.

Legislative Committee—James H. Devlin, Chairman; Walter H. Frick, Vice-chairman.

Public Relations Committee—Roy Lee Smith, Chairman; Walter N. Flanagan, Vice-chairman.

Membership Committee—David Camilli, Chairman; E. E. Appel, Vice-chairman.

Publication Committee—F. G. Ross, Chairman; P. Canfield, Vice-chairman.

Meeting Committee—Karl Atwater, Chairman.

Entertainment Committee—Nathan Leebov, Chairman; R. L. Horne, Vice-chairman.

DELAWARE

February 3, Dean Spencer of the University of Delaware; Russel D. Rogers, Wilmington, Delaware; and myself attended a meeting of the Delaware Legislature at Dover, by invitation. Dean Spencer and I both spoke to them and urged the passage of their Engineer Act. This Act is very good and largely follows the model Act. Its principal difference is that it provides for a special member who is to be a member of a faculty of the University of Delaware. I have every reason to believe that the Act will pass as both parties seem to want it.

Engineer C. E. Myers,
Pennsylvania Society of Professional Engineers

TEXAS

Account of President Arthur V. Sheridan's Visit

When it was definitely established that Mr. Arthur V. Sheridan, President of the National Society of Professional Engineers, was coming to Austin to deliver an address to the members of the Texas Society, steps were taken to arrange a dinner in his honor, and also to take advantage and have present at this dinner, as well as at the address, some outstanding members in the engineering profession that were not members of our Society.

The dinner was arranged for six o'clock in the evening of January eighteenth, and we obtained the Crystal ballroom in the Driskill Hotel for this occasion.

Although many notables whom we invited were unable to attend because of other functions taking place the same evening, we had a notable gathering present at this dinner—men who are in an excellent position to spread the purposes and objectives of this Society to new, fertile fields.

A list of persons, including members of our Society, present at the dinner, are given below.

After the dinner, the Honorable Mayor Tom Miller, of the City of Austin, formally welcomed President Sheridan to Austin. Mayor Miller's remarks were rather varied, but very amusing.

The dinner was over at about seven-thirty, and everyone left for the point where the address was to be given, which was the auditorium of the Geology Building, University of Texas Campus.

Colonel W. B. Tuttle of San Antonio, President of the Texas Society, introduced Mr. Sheridan as the speaker of the evening.

Mr. Sheridan spoke in a masterful way on a subject that he was well qualified to speak upon. The comments that were heard later from members of the University faculty, as well as those others present, were that the address was most interesting and enlightening, and that he went through the subjects that were more or less delicate in a masterful manner.

The particular reference to the part of his address as referred to as being delicate, is that in which he stated we should actually go into politics. This particular question has come up for discussion a number of times without definite result or with varied opinions, and it is believed that Mr. Sheridan has definitely removed the cloudy part of this issue around this particular functioning of our Society.

It is needless to say that our own members have been very enthusiastic about our Society as a whole, and are even more so now than they were before. We most assuredly hope to benefit in many ways by President Sheridan's visit, and particularly with regard to increasing our membership in Texas.

The following is a list of persons and members present at the dinner given in honor of Engineer Arthur V. Sheridan in the Crystal Ballroom of the Driskill Hotel in the evening of January 18, 1937:

Col. W. B. Tuttle, President, Texas Society of Professional Engineers; Chairman, Board of Directors, San Antonio Public Service Company, San Antonio, Texas.

Hon. Tom Miller, Mayor, City of Austin, Austin, Texas.

H. P. Bunger, Construction Engineer, U. S. Reclamation Dept., Austin, Texas.

C. S. Clark, Chairman, State Board of Water Engineers, Austin, Texas.

Guiton Morgan, City Manager, City of Austin, Texas.

Hans Helland, Consulting Engineer, San Antonio, Texas.

E. C. H. Bantel, Assistant Dean of the College of Engineering, University of Texas, Austin, Texas.

W. B. Preston, Chairman, Houston Section, American Society of Mechanical Engineers, New Gulf, Texas.

A. J. McKenzie, Chairman, Legislative Committee, Texas Section, A. S. C. E., San Antonio, Texas.

Joseph Milton Howe, Howe and Wise, Consulting Engineers, Houston, Texas, and former Vice-President Texas Section, A. S. C. E.

Howard E. Degler, Professor of Mechanical Engineering, University of Texas, Austin, Texas.

Carl J. Eckhardt, Jr., Professor of Mechanical Engineering—Superintendent of Utilities, University of Texas, Austin, Texas.

J. A. Correll, Professor of Electrical Engineering, University of Texas, Austin, Texas.

S. P. Finch, Professor of Civil Engineering, University of Texas, Austin, Texas.

Byron E. Short, Assistant Professor Mechanical Engineering, University of Texas, Austin, Texas.

Bill Weeg, Reporter, *The American-Statesman*, Austin, Texas.

J. W. Beretta, National Director, Texas Society of Professional Engineers, San Antonio, Texas.

R. H. Knipping, Secretary, Texas Society of Professional Engrs., Superintendent, City of Austin Power Plant, Austin, Texas.

V. M. Ehlers, Chief Sanitary Engineer, State Health Department, Austin, Texas.

Max P. von Homeyer, Resident Engineer, State Highway Department, Austin, Texas.

Trigg Twichell, U. S. Geological Survey, Austin, Texas.

E. G. Franke, State Highway Department Division Engineer; President, Travis Chapter, Texas Society of Professional Engineers, Austin, Texas.

Hood Pitts, Consulting Engineer, State Board of Control, Austin, Texas.

R. S. Guinn, Assistant Engineer, State Highway Department, Austin, Texas.

H. M. Bohn, Engineer, Austin District, Public Works Administration, Austin, Tex.

Major Paul Wakefield, former Secretary to Governor James V. Allred, San Antonio, Texas.

W. E. Seaholm, Electric Superintendent, City of Austin, Texas.

C. R. Bieberstein, Power Plant Dept., University of Texas, Austin, Texas.

H. E. Tobey, State Highway Department, Austin, Texas.

Tate Dalyrmple, U. S. Geological Survey, Austin, Texas.

F. G. Posey, Lower Colorado River Authority, Buchanan Dam, Texas.

R. A. Nicholson, Secretary, Bexar Chapter, Texas Society of Professional Engineers, San Antonio Public Service Company, San Antonio, Texas.

A. C. Loyd, Loyd Electric Company, San Antonio, Texas.

R. R. Dabney, San Antonio Public Service Company, San Antonio, Texas.

P. W. Sommers, San Antonio Public Service Company, San Antonio.

A. S. Hull, Civil Engineer, Austin, Texas.

J. H. Burch, State Highway Department, San Marcos, Texas.

Phil Ferguson, Professor of Civil Engineering, University of Texas, Austin, Tex.

W. J. Murray Jr., University of Texas, Austin, Texas.

George H. Fancher, Petroleum Engineering Department, University of Texas, Austin, Texas.

B. N. Gafford, University of Texas, Austin, Texas.

H. W. Zuch, Austin, Texas.

W. A. Raatz, State Highway Department, Austin, Texas.

R. M. Stene, Civil Engineer, State Highway Department, Austin, Texas.

Hank Clewis, Austin, Texas.

C. P. Reming, Austin, Texas.

C. K. Leighton, Austin, Texas.

H. H. Power, Austin, Texas.

Austin, Texas,
January 25, 1937.

Engineer Willard S. Conlon, Secretary
National Society of Professional Engineers
National Press Building
Washington, District of Columbia.

Subject: Law and Ethics Committee
T. S. P. E.

Dear Engineer Conlon:

State President, Colonel W. B. Tuttle, recently appointed the following to the Law and Ethics Committee of our Society, who will work with other Societies interested in the passage of the license law for engineers:

H. R. F. Hellend, Chairman, Consulting Engineer, San Antonio, Texas.

W. E. Simpson, Member, Consulting Engineer, San Antonio, Texas.

E. C. H. Bantel, member, Assistant Dean of Engineering, University of Texas, Austin, Texas.

Col. W. B. Tuttle, President, T. S. P. E., Chairman of the Board of Directors, San Antonio Public Service Company, San Antonio, Texas.

I thought you would like to have this information for THE AMERICAN ENGINEER, as it will be interesting information not only for our members, but other engineers in Texas to know these men are on the Committee.

Yours very truly,
R. H. KNIPPING,
Secretary.

Proposed License Law For Professional Engineers In Texas

Note: This proposed License Law is substantially the same as the Model Engineers' License Law which has been adopted and endorsed by the following:

American Society of Civil Engineers, July 4, 1932.

New York State Society of Professional Engineers, Sept. 15, 1932.

American Society of Heating and Ventilating Engineers, Sept. 24, 1932.

American Association of Engineers, Sept. 28, 1932.

National Council of State Boards of Engineering Examiners, Sept. 29, 1932.

Municipal Engineers of the City of New York, Oct. 20, 1932.

Albany Society of Engineers, Dec. 19, 1932.

31 States in the United States now have legal provisions for the licensing of professional engineers.

FOREWORD

This proposed License Law is a copy of the bill introduced in the last General Session of the Legislature as Senate Bill 82 by Redditt and received a unanimously favorable report from the Senate State Affairs Committee. It was never brought to the floor of the Senate nor the House by the author.

This copy is sent out to the interested parties in Texas in order that an attempt to get favorable legislation may be had during the Regular Session in January, 1937.

THIS PROPOSED LAW SHOULD BE PASSED IN TEXAS FOR THE FOLLOWING REASONS:

1. The purpose of this Act is to promote the public welfare by safeguarding life, health and property, upon which its constitutionality is based.

2. Professional skill in the practice of engineering is a grave matter of public concern when applied to the safe and economical design of buildings, dams, paving, bridges, water filtration, sewer and other public works and utilities which demand professional training and experience of the highest nature.

3. The Bill requires every Engineer who practices the Engineering Profession in this state to be of good character and reputation, and fully qualified to engage in Engineering practice by reason of his knowledge of mathematics, the physical sciences, and principles of Engineering, acquired by professional education and practical experience.

4. The qualification of Engineers by a competent examining board will protect the judicial rights of the Public when the Engineer assumes the position of final authority under contracts, and will establish a standard by which the Public will be able to discriminate between the ethical and competent, and the unscrupulous and ignorant Engineer.

5. The effect of enforcement of the Act on the "Licensed Engineer" would be to cause him to exercise more care in the preparation of his plans and specifications, in order to maintain his right to practice, as the cancellation of such right would be equivalent to professional suicide.

6. The direct benefit to the Public derived from requiring Engineers to be fully qualified, and to give careful attention to their work, will be the assurance of adequate, sufficient, safe and economical design of all utilities and structures, protecting the Public from loss of life, injury and jeopardy of health. The failure of a building, dam, or bridge, may cost a score of lives, and waste of money, and the improper design of a water or sewer system may jeopardize the life of entire communities.

7. The Bill will protect the graduates of Engineering Colleges of this State, in which the State has a very definite investment, and also its own Citizens, who are practicing Engineering, from the unfair competition of those Engineers who are migrating to Texas because they cannot qualify to practice Engineering under the license laws already in effect in other states.

8. Similar Engineers' license laws are in force in thirty-one states, with similar legislation now pending in thirteen additional states. No state which has ever adopted a registration law for Engineers has abandoned it, nor have ever such laws been amended for the purpose of weakening any of its provisions.

9. The Bill will protect the General Public from being victimized by the malpractice of smooth-tongued advertising promoters, incompetents, imposters and grafters who style themselves Engineers and prey upon the Public.

10. The administration of the Act will be self-supporting, and not one cent of the State's funds can be used to meet any expenses of enforcement.

PROPOSED ENGINEER LICENSE LAW FOR TEXAS

A Bill to be entitled:

AN ACT defining and regulating the practice of professional engineering in the State of Texas; providing for the creation of the State Board of Registration for Professional Engineers and prescribing their powers and duties, terms of office, qualifications and for payment of their compensation and expenses out of registration fees and from the "Professional Engineering Fund" as provided in this law; providing for removal of members of the Board for cause; providing for creation of "Professional Engineers' Fund" and appropriating money therefrom; pre-

scribing requirements for registration of professional engineers; providing for registration fees and for examinations of applicants for certificate of registration and for issuance and use of certificates and seals; providing for issuance of renewal certificates on payment of renewal fees; providing that a firm, co-partnership, corporation or joint stock association may engage in the practice of professional engineering in this State provided such practice is carried on by only professional engineers registered in this State; providing for issuance within one year after this Act becomes effective of certificates, on certain conditions, to residents of Texas practicing professional engineering in Texas at time this Act becomes effective; providing that after January 1, 1938, it shall be unlawful for this State, or any of its political subdivisions, or any county, city or town, to engage in the construction of public work involving professional engineering, unless plans, specifications and estimates have been prepared by and construction executed under direct supervision of a registered professional engineer, provided that such provision shall not apply to any public work wherein the contemplated expenditure for completed project does not exceed $2,000.00; providing for certain exemptions; prescribing certain reciprocity provisions for professional engineers holding certificates of registration as such issued under authority of National Council of State Boards of Engineering Examiners, or National Bureau of Engineering Registration, or any State or Territory or Possession of the United States, or any Country, under certain conditions; providing for revocations and reissuances of certificates, and providing the grounds on which the Board may revoke certificates of registration and for hearing on such charges; providing for suit against Board in certain District Courts to annul or vacate order of Board revoking certificate of registration; defining as a misdemeanor certain acts committed after the first day of January, 1938; prescribing the penalties for such violations and that each day of such violation shall be a separate offense; prescribing duties of Board in connection with enforcement of provisions of Act and duties of Attorney General and his assistant as legal advisor of Board; declaring certain legislative intent in respect to this Act; repealing conflicting laws, provided, however, that this Act shall not be construed as repealing or amending any law affecting or regulating Licensed State Land Surveyors and that Licensed State Land Surveyors in performing their duties as such shall not be subject to the provisions of this Act; and further providing that this Act shall not be construed to affect or prevent the practice of any other legally recognized profession by members of such profession licensed by the State or under its authority.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

Section 1. General Provisions.—That in order to safeguard life, health, and property, any person practicing or offering to practice the profession of engineering shall hereafter be required to submit evidence that he is qualified so to practice and shall be registered as hereinafter provided; and it shall be unlawful for any person to practice or offer to practice the profession of engineering in this State, or to use in connection with his name or otherwise assume, use, or advertise any title or description tending to convey the impression that he is a professional engineer, unless such person has been duly registered or exempted under the provisions of this Act.

Section 2. Definitions.—The term "professional engineer" as used in this Act shall mean a person who, by reason of his knowledge of mathematics, the physical sciences, and the principles of engineering, acquired by professional education and practical experience, is qualified to engage in engineering practice as hereinafter defined.

The practice of professional engineering within the meaning and intent of this Act includes any professional service, such as consultation, investigation, evaluation, planning, design, or responsible supervision of construction in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works, or projects, wherein the public welfare, or the safeguarding of life, health or property is concerned or involved, when such professional service requires the application of engineering principles and data.

The term "Board" as used in this Act shall mean the State Board of Registration for Professional Engineers, provided for by this Act.

Section 3. State Board of Registration for Professional Engineers. — Appointment of Members.—Terms.—A State Board of Registration for Professional Engineers is hereby created whose duty it shall be to administer the provisions of this Act. The Board shall consist of six professional engineers, who shall be appointed by the Governor of the State from among nominees recommended by the representative engineering societies in the State, as ascertained to be such by the Governor, and shall have the qualifications required by Section 4 of this Act. The members of the first Board shall be appointed within ninety (90) days after this Act becomes effective, to serve the following terms: Two members for two years; two members for four years; and two members for six years, from the date of their appointment or until their successors are duly appointed and qualified. Thereafter, at the expiration of the term of each member first appointed, his successor shall be appointed by the Governor of the State and he shall serve for a term of six years or until his successor shall be appointed and qualified. Before entering upon the duties of his office each member of the Board shall take the constitutional oath of office and the same shall be filed with the Secretary of State. Each member of the Board first appointed hereunder shall receive a certificate of registration under this Act from said Board.

Section 4. Qualifications of Members of Board.—Each member of the Board shall be a citizen of the United States and a resident of this State, and shall have been engaged in the practice of the profession of engineering for at last twelve years, and shall have been in responsible charge of important engineering work for at least five years. Responsible charge of engineering teaching may be construed as responsible charge of important engineering work.

Section 5. Compensation and Expenses of Board Members.—Each member of the Board shall receive the sum of Ten ($10.00) Dollars per day for each day he is actually engaged in the duties of his office, including time spent in necessary travel, together with all legitimate expenses incurred in the performance of such duties. All per diem and expenses incurred hereunder shall be paid from moneys received by the Board from examination and registration fees and from the "Professional Engineering Fund" as provided in this law; no money shall ever be paid to any member of the Board from the General Fund of the State.

Section 6. Removal of Members of Board. —Vacancies.—The Governor may remove any member of the Board for misconduct, incompetency, neglect of duty, or for any other sufficient cause. Vacancies in the membership of the Board shall be filled for the unexpired term by appointment by the Governor as provided in Section 3.

Section 7. Organization and Meetings of the Board.—The Board shall hold a meeting within thirty days after its members are first appointed, and thereafter shall hold at least two regular meetings each year. Special meetings shall be held at such time as the by-laws of the Board may provide. Notice of all meetings shall be given in such manner as the by-laws may provide. The Board shall elect or appoint annually from its own membership the following officers: A Chairman, a Vice Chairman, and a Secretary. A quorum of the Board shall consist of not less than four members.

Section 8. Powers of the Board.—The Board shall have the power to make all by-laws and rules, not inconsistent with the Constitution and Laws of this State, which may be reasonably necessary for the proper performance of its duties and the regulations of the proceedings before it. The Board shall adopt and have an official seal. The Board shall have such additional power as may be conferred by other provisions of this Act.

Section 9. Receipts and Disbursements.— The Secretary of the Board shall receive and account for all moneys derived under the provisions of this Act, and shall pay the same monthly to the State Treasurer, who shall keep such moneys in a separate fund to be known as the "Professional Engineers' Fund." Such fund shall be kept separate and apart from all other moneys in the Treasury, and shall be paid out only by warrant of the State Comptroller upon the State Treasurer, upon itemized vouchers, approved by the Chairman and attested by the Secretary of the Board. All moneys in the "Professional Engineers' Fund" are hereby specifically appropriated for the use of the Board. The Secretary of the Board shall give a surety bond to this State in such sum as the Board may determine. The premium on said bond shall be regarded as a proper and necessary expense of the Board, and shall be paid out of the "Professional Engineers' Fund." The Secretary of the Board shall receive such salary as the Board shall determine in addition to the compensation and expenses provided for in Section 5. The Board may employ such clerical or other assistants as are necessary for the proper performance of its work, and may make expenditures of this fund for any purpose which in the opinion of the Board is reasonably necessary for the proper performance of its duties under this Act, including the expense of the Board's delegates to annual convention of, and membership dues to, the National Council of State Boards of Engineering Examiners. Under no circumstances shall the total amount of warrants issued by the State Comptroller in payment of the expenses and compensation provided for in this Act exceed the amount of the examination and registration fees collected as herein provided.

Section 10. Records and Reports.—The Board shall keep a record of its proceedings and a register of all applications for registration, which register shall show (a) the

name, age, and residence of each applicant; (b) the date of the application; (c) the place of business of such applicant; (d) his educational and other qualifications; (e) whether or not an examination was required; (f) whether the applicant was rejected: (g) whether a certificate of registration was granted; (h) the date of the action of the Board; and (i) such other information as may be deemed necessary by the Board.

The records of the Board shall be prima facie evidence of the proceedings of the Board set forth therein, and a transcript thereof, duly certified by the Secretary of the Board under seal, shall be admissible in evidence with the same force and effect as if the original were produced.

Annually, as of August 31st, the Board shall submit to the Governor a report of its transactions of the preceding year, and shall also transmit to him a complete statement of the receipts and expenditures of the Board, attested by affidavits of its Chairman and its Secretary.

Section 11. Roster of Registered Engineers.—A roster showing the names and places of business of all registered professional engineers shall be prepared by the Secretary of the Board during the month of July of each year, commencing one year from the date this law becomes effective. Copies of this roster shall be mailed to each person so registered, placed on file with the Secretary of State, and furnished to the public upon request.

Section 12. General Requirements for Registration.—The Following shall be considered as minimum evidence satisfactory to the Board that the applicant is qualified for registration as a professional engineer, to-wit:

(1) As a professional engineer:

a.—Graduation from an approved course in engineering of four years or more in a school or college approved by the Board as of satisfactory standing; and a specific record of an additional four years or more of active practice in engineering work of a character satisfactory to the Board, and indicating that the applicant is competent to be placed in responsible charge of such work; or

b.—Successfully passing a written, or written and oral, examination designed to show knowledge and skill approximating that attained through graduation from an approved four year engineering course; and a specific record of eight years or more of active practice in engineering work of a character satisfactory to the Board and indicating that the applicant is competent to be placed in responsible charge of such work.

At any time within five years after this Act becomes effective the Board may accept as evidence that the applicant is qualified for registration as a professional engineer a specific record of twelve years or more of lawful active practice in engineering work of a character satisfactory to the Board and indicating that the applicant is qualified to design to operate or to supervise construction of engineering works and has had responsible charge of important engineering work for at least five years and provided applicant is not less than thirty-five years of age.

After this Act shall have been in effect five years, the Board shall issue Certificates of Registration only to those applicants who meet the requirements of Section 12, 1(a) or (b), or Section 21.

Provided, that no person shall be eligible for registration as a professional engineer who is not of good character and reputation.

In considering the qualifications of applicants, responsible charge of engineering teaching may be construed as responsible charge of engineering work. The satisfactory completion of each year of an approved course in engineering in a school or college approved by the Board as of satisfactory standing, without graduation, shall be considered as equivalent to a year of active practice. Graduation in a course other than engineering from a college or university of recognized standing shall be considered as equivalent to two years of active practice; provided, however, that no applicant shall receive credit for more than four years of active practice because of educational qualifications. The mere execution, as a contractor, of work designed by a professional engineer, or the supervision of the construction of such work as a foreman or superintendent shall not be deemed to be active practice in engineering work.

Any person having the necessary qualifications prescribed in this Act to entitle him to registration shall be eligible for such registration though he may not be practicing his profession at the time of making his application.

Section 13. Applications and Registration Fees.—Applications for registration shall be on forms prescribed and furnished by the Board, shall contain statements made under oath, showing the applicant's education and detail summary of his technical work, and shall contain not less than five references, of whom three or more shall be engineers having personal knowledge of his engineering experience.

The registration fee for professional engineers shall be twenty-five dollars ($25.00), fifteen dollars ($15.00) of which shall accompany application, the remaining ten dollars ($10.00) to be paid upon issuance of certificate. When a Certificate of Qualification issued by the National Bureau of Engineering Registration is accepted as evidence of qualification, the total fee for registration as professional engineer shall be ten dollars ($10.00).

Section 14. Examinations.—When oral or written examinations are required, they shall be held at such time and place as the Board shall determine. The scope of the examinations and the methods of procedure shall be prescribed by the Board with special reference to the applicant's ability to design and supervise engineering works, which shall insure the safety of life, health and property. Examinations shall be given for the purpose of determining the qualifications of applicants for registration in professional engineering. A candidate failing on examination may apply for re-examination at the expiration of six months and will be re-examined without payment of additional fees. Subsequent examination will be granted upon payment of a fee to be determined by the Board.

Section 15. Certificates. — Seals.—The Board shall issue a certificate of registration upon payment of registration fee as provided for in this Act, to anv applicant who, in the opinion of the Board, has satisfactorily met all the requirements of this Act. In case of a registered engineer, the certificate shall authorize the practice of "professional engineering." Certificates of registration shall show the full name of the registrant, shall have a serial number, and shall be signed by the Chairman and the Secretary of the Board under seal of the Board.

The issuance of a certificate of registration by this Board shall be evidence that the person named therein is entitled to all the rights and privileges of a registered professional engineer, while the said certificate remains unrevoked or unexpired.

Each registrant hereunder shall upon registration obtain a seal of the design authorized by the Board, bearing the registrant's name and the legend, "Registered Professional Engineer." Plans, specifications, plats, and reports issued by a registrant shall be stamped with the said seal when filed with public authorities, during the life of the registrant's certificate, but it shall be unlawful for any one to stamp or seal any documents with said seal after the certificate of the registrant named thereon has expired or has been revoked, unless said certificate shall have been renewed or re-issued.

Section 16. Expiration and Renewals.—Certificates of registration shall expire on the last day of the month of December following their issuance or renewal and shall become invalid on that date unless renewed. It shall be the duty of the Secretary of the Board to notify every person registered under this Act, of the date of the expiration of his certificate and the amount of the fee that shall be required for its renewal for one year; such notice shall be mailed at least one month in advance of the date of the expiration of said certificate. Renewal may be effected at any time during the month of December by the payment of a fee of five dollars ($5.00). The failure on the part of any registrant to renew his certificate annually in the month of December as required above shall not deprive such person of the right of renewal, but the fee to be paid for the renewal of a certificate after the month of December shall be increased ten per cent for each month or fraction of a month that payment of renewal is delayed; provided, however, that the maximum fee for delayed renewal shall not exceed twice the normal renewal fee.

Section 17. Firms, Partnerships, Corporations and Joint Stock Associations.—A firm, or a co-partnership, or a corporation, or a joint stock association may engage in the practice of professional engineering in this State, provided such practice is carried on by only professional engineers registered in this State.

Section 18. Practitioners at Time Act Became Effective.—At any time within one year after this Act becomes effective, upon due application therefor and the payment of the registration fee of twenty-five dollars ($25.00) for professional engineers, the Board shall issue a certificate of registration, without oral or written examination, to any professional engineer who shall submit evidence under oath satisfactory to the Board that he is of good character, has been a resident of the State of Texas for at least one year immediately preceding the date of his application, and was practicing professional engineering if an engineer at the time this Act became effective, and has had responsible charge of work of a character satisfactory to the Board.

After this Act shall have been in effect one year, the Board shall issue certificates of registration only as provided for in Section 12 or Section 21 thereof.

Section 19. Public Work.—After the first day of January, 1938, it shall be unlawful for this State, or for any of its political subdivisions for any county, city, or town, to engage in the construction of any public work involving professional engineering, unless the plans and specifications and estimates have been prepared by, and the construction executed under the direct supervision of, a registered professional engineer; provided, that nothing in this Section shall be held to apply to any public work wherein the con-

templated expenditure for the completed project does not exceed two thousand dollars ($2,000.00).

Section 20. Exemptions.—The following persons shall be exempt from the provisions of this Act, to-wit:

(a) A person not a resident of and having no established place of business in this State, practicing or offering to practice herein the profession of engineering, when such practice does not exceed in the aggregate more than sixty days in any calendar year; provided, such person is legally qualified by registration to practice the said profession in his own State or County in which the requirements and qualifications for obtaining a certificate of registration are not lower than those specified in this Act.

(b) A person not a resident of and having no established place of business in this State, or who has recently become a resident thereof, practicing or offering to practice herein for more than sixty days in any calendar year the profession of engineering, if he shall have filed with the Board an application for a certificate of registration and shall have paid the fee required by this Act. Such exemption shall continue only for such time as the Board requires for the consideration of the application for registration; provided, that such a person is legally qualified to practice said profession in his own State or country in which the requirements and qualifications for obtaining a certificate of registration are not lower than those specified in this Act.

(c) An employee or a subordinate of a person holding a certificate of registration under this Act, or an employee of a person exempted from registration by Classes (a) and (b) of this Section; provided, his practice does not include responsible charge of design of supervision.

(d) Officers and employees of the Government of the United States while engaged within this State in the practice of the profession of engineering for said Government.

Section 21. Reciprocity.—The Board may, upon application therefor, and the payment of a fee of ten dollars ($10.00), issue a Certificate of Registration as a Professional Engineer to any person who holds a Certificate of Qualification or Registration issued to him by proper authority of the National Council of State Boards of Engineering Examiners, or of the National Bureau of Engineering Registration, or of any State or Territory or Possession of the United States, or any Country, provided that the requirements for the registration of professional engineers under which said Certificate of Qualification or Registration was issued do not conflict with the provisions of this Act and are of a standard not lower than that specified in Section 12 of this Act.

Section 22. Revocations and Re-Issuances of Certificates.—The Board shall have the power to revoke the certificate of registration of any registrant who is found guilty of:

(a) The practice of any fraud or deceit in obtaining a certificate of registration;

(b) Any gross negligence, incompetency, or misconduct in the practice of professional engineering as a registered professional engineer.

In determining any such charges the Board shall proceed upon sworn information furnished it by any reliable resident of this State; such information shall be in writing and shall be duly verified by the person familiar with the facts therein charged, and three copies of the same shall be filed with the Secretary of the Board. Upon receipt of such information the Board, if it deems the information sufficient to support further action on its part, shall make an order setting the charge therein contained for hearing at a specified time and place, and the Secretary of the Board shall cause a copy of the Board's order and of the information to be served upon the accused at least thirty days before the date appointed in the order for the hearing. The accused may appear in person or by counsel, or both, at the time and place named in the order and make his defense to the same. If the accused fails or refuses to appear, the Board may proceed to hear and determine the charges in his absence. If the accused pleads guilty, or upon a hearing of the charges the Board and a majority of its members shall find them to be true, it may enter an order revoking the certificate of registration of such registered professional engineer. The Board shall have the power, through its President or Secretary, to administer oaths and compel the attendance of witnesses before it as in civil cases in the District Court by suppoena issued over the signature of the Secretary and seal of the Board. If the accused desires the evidence to be preserved, and shall so inform the Board before the hearing is begun and shall deposit with the Board such a sum of money as the Board may deem reasonably necessary for the employment of a stenographer, then the Board shall employ such stenographer and when so employed he shall be the official stenographer of the Board for the purpose of reporting the evidence and proceedings of such Board. In proceeding under this section, as under others, a majority of the Board shall constitute a quorum.

When the Board has completed such hearing it shall make a record of its findings and order and shall cause a certified copy thereof to be forwarded to the accused.

Any person who may feel himself aggrieved by reason of the revocation of his certificate of registration by the Board, as hereinabove authorized, shall have the right to file suit within thirty days after receiving notice of the Board's order revoking his certificate of registration, in the District Court of the County of his residence, or of the county in which the alleged offense relied upon as grounds for revocation took place, to annul or vacate the order of the Board revoking the certificate of registration. Said suit shall be filed against the Board as defendant, and service of process may be had upon its Chairman or Secretary. The suit shall be tried as other civil causes, the burden of proof developing upon the plaintiff assailing the order of revocation.

The Board, for reasons it may deem sufficient, may re-issue a certificate of registration to any person whose certificate has been revoked, provided four or more members of the Board vote in favor of such reissuance. A new certificate of registration, to replace any certificate revoked, lost, destroyed, or mulitated, may be issued subject to the rules of the Board and a charge of three dollars ($3.00) shall be made for such issuance.

Section 23. Violations and Penalties.—On or after the first day of January, 1938, any person who shall practice, or offer to practice, the profession of engineering in this State without being registered or exempted in accordance with the provisions of this Act, or any person presenting or attempting to use as his own the certificate of registration or the seal of another, or any person who shall give any false or forged evidence of any kind to the Board or to any member thereof in obtaining a certificate of registration, or any person who shall falsely impersonate any other registrant of like or different name, or any person who shall attempt to use an expired or revoked certificate of registration, or any person who shall violate any of the provisions of this Act, shall be guilty of misdemeanor, and shall upon conviction be fined not less than one hundred dollars ($100.00) nor more than five hundred dollars ($500.00), or be confined in jail for a period of not exceeding three months, or both. Each day of such violation shall be a separate offense.

The Board is charged with the duty of aiding in the enforcement of the provisions of this Act, and any member of the Board may present to a prosecuting officer complaints relating to violations of any of the provisions of this Act; and the Board through its members, officers, counsel and agents may assist in the trial of any cases involving alleged violations of said statutes, subject to the control of the prosecuting officers.

The Attorney General or his assistant shall act as legal advisor of the Board and shall render such legal assistance as may be necessary in enforcing and making effective the provisions of this Act; providing that this shall not relieve the local prosecuting officers of any of their duties under the law as such.

Section 24. Invalid Portions.—If any articles, section, subsection, sentence, clause or phrase of this Act is for any reason held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this Act. The Legislature hereby declares that it would have passed this Act and each section, subsection, sentence, clause or phrase thereof irrespective of the fact that any one or more of the sections, subsections, sentences, clauses or phrases be declared unconstitutional.

Section 25. Repeal of Conflicting Legislation with Proviso.—All laws or parts of laws in conflict with the provisions of this Act shall be and the same are hereby repealed. Provided, however, that this Act shall not be construed as repealing or amending any laws affecting or regulating Licensed State Land Surveyors; and such Licensed State Land Surveyors in performing their duties as such shall not be subject to the provisions of this Act; nor shall this Act be construed to affect or prevent the practice of any other legally recognized profession by the members of such profession licensed by the State or under its authority.

A COMMISSIONER SPEAKS

Public Service Commissioner Frederick P. Gruenberg in a recent talk to the Engineers Society of Pennsylvania at Harrisburg said in part:

"Trained personnel in the public service is characteristic of the present technical age. Increasingly, the functions of government—national, state and local—require the services of men and women particularly equipped to render specialized service.

"It behooves us to do our part in creating an effective public opinion which will eventually demand for all except policy-determining public servants: (1) employment on a basis of training and fitness for the work to be done, (2) security of employment conditioned on capacity to do the work and honesty in its performance, (3) adequate compensation, plus promotional opportunities for an ambitious career, and (4) ease of mind against the fear of want in old age provided through intelligent pensions systems."

TEN FACTS ON TECHNOLOGY AND EMPLOYMENT

(Continued from page 8)

five children between 10 and 15 years of age working in 1900 to less than one in twenty in 1930.

5. Less Than 4% of 2½ Million Blame Machines for Loss of Jobs

Only 4 per cent of about 2,500,000 unemployed studied in the Federal Unemployment Census of April, 1930, reported that they lost their jobs on account of "industrial policy," under which the displacement of men by machines was listed as one of several sub-classifications.

6. Eighty-four Per Cent of All Machines Invented Are "Labor Serving" Rather Then "Labor Saving"

Only 16 per cent of all inventions have as their primary purpose the saving of labor according to a study of recent patents. Most machines are invented to create entirely new products, to render new services or to improve old products or services. Seven-tenths of all inventions tend to increase labor's relative share of the national income.

7. Workers Are in Greatest Demand Where Most Machines Are Installed

After a detailed study of the effect of technology on unemployment, the National Industrial Conference Board concluded that "industries which advanced most rapidly along technological lines drew most heavily on the labor supply, while industries which were mechanized more slowly absorbed smaller portions of the available working force. This is due to the fact that machines decrease costs and prices, improve the quality of goods, and stimulate sales. Employment is thus increased throughout the innumerable fields of the industrial system."

8. Machinery Has Raised Labor's Earning Power

Real wages—the purchasing power of labor in terms of goods—more than doubled between 1900 and 1935. Higher wages have been made possible by greater production. In the first thirty years of this century production per wage earner increased 68 per cent, but to make this increase possible manufacturers installed 331 per cent more equipment, measured in horsepower. An important factor in increasing the value of all incomes in terms of goods was the reduction of prices made possible by technological advancement.

Wage and salary earners received 67.4 per cent of the national income of 1934 (the latest year for which figures are readily available)—a larger share than ever before in history. While production of American factories increased 216 per cent between 1899 and 1929, wages paid to labor increased 470 per cent.

9. Higher Standard of Living Attainable Only Through Increased Production By the Use of Machinery

Production on the scale and of the quality essential to provide the present American standard of living would be impossible without the machinery used today. Much of the work that must be done in industry is of such a nature that it would be physically impossible for human hands to do it. Moreover, if technological advancement did not make possible a greater volume of production the standard of living could be raised only by increasing hand labor. Had it been necessary to increase hand labor in the same proportion as production between 1900 and 1930, every adult man and woman in the nation and several million children would have been needed in jobs. It would have required more than 60 per cent of the entire population whereas only about 40 per cent ever seeks gainful employment, the remaining 60 per cent being constituted chiefly of women and children supported by the 40 per cent. The absolute limit of improved living standards would be quickly reached if industry instituted no technological advancements. With the increased use of machinery there need be no limit to the abundance of goods and services enjoyed.

10. Need to Raise 1929 Production Level 75 Per Cent

A 75 per cent increase in the 1929 production level would be necessary to provide a "reasonable" standard of living for every family in the United States, according to the Bureau of Home Economics of the United States Department of Agriculture. The productive equipment of 1929, according to exhaustive surveys, was capable of producing only about 20 per cent more than it did. From this it would appear that there is still plenty for both men and machines to do.

THE WORKS PROGRAM

(Continued from page 10)

originated the projects requested by their local officials. If we look at the physical inventory of projects alone, a part of it may be recited as follows:

Accomplishments. The present day pattern of frontier life is lived by the millions of farm families whose homes are not on the improved roads. 130,000 miles of these roads are being improved besides the work on hundreds of miles of city pavement, street and alleys, sidewalk and curbs, and on thousands of bridges, viaducts and culverts.

In the service of better education more than 6,000 schools have been built or repaired. More than 5,000 other public buildings have provided places for work. Nearly 6,000 parks, playgrounds and athletic fields have been built new or improved greatly. The benefit is far greater than one might at first believe. Some can be found on comparison of old police records with new.

Works Progress Administration workers are carrying out nearly 4,000 flood control and other conservation projects. Get one who has suffered from one of these disasters to help place a value on the work.

Sewer construction and the laying of water lines are inglorious tasks, but over 5,000 sewer systems have been extended by Works Progress Administration workers and nearly half as many water systems improved. There is not much to see but the value is there.

For the benefit of air travelers, Works Progress Administration workers are airmarking thousands of cities and towns and are building or improving 551 airports and landing fields.

In nearly every community, large or small, Works Progress Administration workers are carrying on the program of construction to improve sanitation and health, to expedite and increase the safety of travel, to house public services and to provide additional facilities for recreation and enjoyment of leisure.

This was still a task to test the ingenuity of local officials. It is estimated that the work of repairing library books, rare documents, revising public records, and making tax surveys and studies has recovered or saved millions of dollars. Scientists in our great universities and teachers throughout the land are engaged on projects. In the field of recreation and community organization of leisure, a great advance has been made. Architects and engineers are doing their share. The recorded measurements of all historic buildings will insure the possibility of authentic restoration if the original structure is destroyed. The field work and office computations of the nation's basic mapping program have been advanced and many local surveys of high value are being carried forward. Disemployed artists, writers, musicians, actors, and theatre technicians are maintaining themselves and giving the people of America dollar for dollar in value that cannot be measured in terms of cubic yards of concrete in place or in the cubic contents of a finished building.

Nearly half a million women have been given assignments at worth-while work. They are sewing, nursing, and teaching. To evaluate the whole relief program, it would be necessary to learn of the garments made for the destitute, of the sick who were cared for, of the untrained who had been taught to do useful work.

Evaluation. These projects combine with those for engineering structures to make the Works Progress Administration program. That program cannot be evaluated by old standards.

The United States Conference of Mayors in a report to the President recognized these social as well as pecuniary values when they said:

"The integrity and permanent usefulness of the city projects which have been approved by the Federal Government need no apology from anyone. These are the cities' own projects. Honest and impartial analysis ..... will reveal that practically every project represents a useful and, in most cases, a permanent public improvement."

I think that qualification of honesty and impartiality is the only limiting provision you should adopt or permit in your inquiry as to the value of the work relief program.

I believe it is the duty of each of you as an interested citizen to inspect and evaluate the projects in your home locality. You will, as a matter of professional ethics, consider the avowed purpose of the work, the circumstances which control the selection of personnel the many other economic and social factors which cannot be separated from the very real and obvious accomplishments. When you do that, I venture to predict that you will find each of these lowly tasks an appreciable increment of the greatest humanitarian enterprise of all time.

INTELLECTUAL ENDEAVOR

(Continued from page 11)

that of an old one, provided that they are both entirely of metal and of the same weight.

In his *Rural Engineering,* Granvoinet gave for the cost of a whole metal plow constructed about 1830 the value of 1 franc 44 per kilo.

In the old *Course in Agriculture* of Girardin, we find for forged pieces used in the rebuilding of plows, around 1830, the price of 1 fr. 50 per kilo, which coincides pretty well with the former figure.

Taking, from the Album of modern builders, ordinary models of plows, comparable (as far as an estimate of weight is concerned) with the plows of 1830, we find the price quoted as 7 francs per kilo.

Thus an ordinary plow weighing 100 kilos would today cost 700 francs versus 144 francs in 1830. But in 1830 the average hourly wage (all classes) was 0 fr. 22 while in 1932 it was 4 francs 35.

If the two plows contained, in hours of all kinds, starting from the very time of mining, the same working time, we should (whatever may be the amount of profit or other deductions, and whatever may be the importance attached to the monetary depreciation which is eliminated) arrive at the number of hours on dividing each total cost price by its respective wage cost per hour.

Thus:— $700 \div 4.35 = 160$ hours.

While— $144 \div 0.22 = 654$ hours.

The times of labor are unequal and the ratio $\frac{160}{654} = \frac{1}{4.08}$ shows that the construction of the 1932 plow took four times less work hours than were required in 1830.

These examples tend to prove that "the saving in industrial labor due to technics, or in other words to intellectual work, is after a century, equal to the average saving in agricultural labor," and that for the entire saving we may use a coefficient of 4. A detailed study of other branches of human activity would only corroborate (in general) these conclusions: the extreme cases which could be cited would compensate each other. In fact, if certain articles are manufactured in quantities many are repaired or are renewed piecemeal, and many products admit of little improvement, or are very little improved.

It is not therefore foolhardy to assert that specific industrial and agricultural productiveness has been, thanks solely to the labor of intellectuals in the domain of technics, multiplied by 4 in the course of a century. In other words ¾ of all human production of material benefits have no other source than intellectual labor.

MACHINERY: CRITICISM AND CREDIT.—However, during these last years, a theory has arisen which makes machinery responsible for the present crisis, due to the overproduction which will be the inevitable result, and which consequently must be assigned as the cause of the labor standstill.

In 1898 an investigator from the labor bureau of Washington had already come to the conclusion that machinery was the cause of reducing human labor in the proportion of 31 to 1, and that it was responsible for 30 workers deprived of a livelihood.

Today, a contemporary well known builder writes:

"If the occasion were to arise, we technicians would be in a position to construct a machine capable of putting on the market several thousand automobiles a day, without the necessity of any hand work, which means to say that in such a construction, recourse would have been had solely to automatic appliances which derived their energy elsewhere than from man power.

In such an event 780,000 individuals would be thrown out of work, and thousands of workmen, engineers, and technicians who depend on their industry for a living, would be down and out.

In his work: "And yet this is the Golden Age," Mr. Chaux makes the supposition of the construction of 4 giant machines capable of producing—apart from food—all that would be necessary throughout the entire world, and then asks what—with the exception of the 4 privileged mechanics—would become of all the other workmen who would thus be laid off from work.

Now, the American investigator and the French builder, whose conclusions were based solely on the time measurement of direct hand work, have taken no account of the absent and hidden hand work which went into the construction of the machines and into the installation thereby necessitated: and their reasoning is monstrously inaccurate since, as we have shown above, it is only by 4 and not by any fantastic figures that industrial production must be multiplied. And on the other hand, we are justified in replying to Mr. Chaux's question that if the 4 giant machines were to last, let us say, 10 years, then all the other toilers of the world must be busied during these 10 years in constructing 4 other machines to replace them, and it has by no means been shown that they will have completed their work before the date fixed upon, and that lack of work would result; for it has been observed, on the contrary, that economic output will diminish after the attainment of a maximum figure, that is to say there will be a wasting and not a saving of hand work. An exaggerated automatic service always degenerates, despite appearances, into a final loss of manual labor,—since the increase of indirect labor more than counterbalances the gain of direct labor. It is a mistaken economy of time, fully recognized by designers of equipment and heads of factories, who, to an ideal, but more costly, first installation, prefer one that is less elaborate and less costly, and which admits of only a slight increase of production, and which, by way of compensation, reduces the final cost to a minimum. Every one knows that whatever is free is dear when account is taken of the work which has been put therein, and that in many cases an ordinary stripping lathe works more cheaply than an automatic one, on account of the amortization of indirect labor represented by its sale price.

Undoubtedly machinery implies an advanced specialization of production and necessitates a super utilization (made sufficiently effective) of means at hand. And if there is wholesale production the finished product is always disposed of at retail; but all that is needed is that the consumers be sufficiently numerous and that they be possessed of varied needs.

The industrialist who knows his business and who is anxious to make a profit, will travel along a middle course, will not foster too high expectations, and will not resort to the use of an exaggerated automatic equipment whose excessive productiveness would transcend the possibility of his sales, and whose excessive amortization would increase the factory prices instead of reducing them proportionally.

Under these conditions, every time he buys a machine he pays for the labor of a considerable number of workers of all professions, and often gives occasion for the creation of new industries. Having, with every possible exactitude, adjusted his sale price to the purchasing power of the class of consumers whom he wants to reach, he makes his article more easily obtainable, and the workman who has produced becomes its first consumer and beneficiary; for he considers it no longer as a luxury but as something indispensable which he will even come, in the public interest, to undervalue, in spite of himself, in proportion to its cheapness.

As the number of consumers increases, if the industrialist has been obliged temporarily to lay off, let us suppose, a maximum, not of 30 as we have seen, but of 3 workers, these could have been taken up by the prosperous industries, in those newly created, or even in the old one if its prosperity will admit of the purchase of new machines. Besides fortunately there are actually not 3 men out of work for one worker, and it must be recognized that, despite his unjust and pitiful moral and material condition, the individual of 1936 who is out of work, receives daily assistance with which he can buy more bread than was possible for a man working at hard labor in 1830.

The machine, a means by which technical ingenuity effects mechanical progress, frees man from the animal tasks which formerly used to enslave him beyond measure. It does not multiply production by unlikely numbers but only by 4, which, true, is not insignificant. It does not forcibly reduce the number of workers whom it "permits, on the contrary, to live better with shorter and less arduous labor." For if today the hour of work is 4 times more productive, the workman must receive 4 times more real benefit in return; otherwise he would be more exploited. Let us verify it. (Of course wages must be guaged not by money which is variable, but by actual benefits: for example let us take wheat.)

In 1930 the average workman earned ofr. 22 per hour, and wheat sold at 30 francs per hundred weight. Output of wheat per hour = ofr. 22 ÷ ofr. 30 = okg. 733 gr. in 1830.

At the present time the same workman earns 4 francs 35 per hour, and wheat is worth about 80 francs. The actual output of wheat per hour = 4 fr. 35 ÷ ofr. 80 = 5 kg. 4375 gr.

The coefficient of increase = 5.4375 ÷ 0.733 = 7.45.

The workman therefore earns in wheat about 7.5 times more per hour, but as his work day is shorter he gets only 5 or 6 times more wheat per day.

The coefficient quoted above seems then to be an acceptable figure.

Remark that the hourly salary in real benefits increases in proportion to the productivity (slightly more because the portion attributed to the workman is really greater). The hourly wage of a Parisian millwright represents about 4 or 5 kilograms of bread which would have represented formerly the earning for one day. If we make the same comparisons during a time twice shorter, say half a century, we will find that the purchasing power of wages has manifestly doubled. The benefit accruing to the workman is therefore that he lives better with shorter and less arduous work.

He is indebted for this, principally to workers who use their mind.

After a century of technical progress, an almost doubled population in France lives about 5 times better than formerly. However, this does not mean happiness.

The fact is that we have reached the point, as we have already said, where that which was secondary has become important, and where what was important becomes secondary. However, although misery still exists, and although the present crisis tends to indicate that the workman's purchasing power is still inconsiderable, man is not as unhappy as formerly. We can not appreciate this evolution because we are entirely too close to it, but every one can bring it into prominence by comparing, as we have done, the conditions of work and production in 1830 with those of our day. In spite of this, technical progress remains cramped and denied because the increase of real benefits which it offers us is not accompanied by an increase of money, the only thing men seem to covet.

ROLE PLAYED BY THE ENGINEER IN INDUSTRY.—There are actually in France some 50,000 Engineers whose business it is to apply all the sciences to all technical works. Their daily labor, unsuspected by hundreds of economists, consists in perfecting machines and methods so as to obtain manufactured articles at less price, that is to say, with minimum of man labor.

Now, though every Frenchman believes,

and sometimes even exaggeratedly so, that a machine can do everything, very few know that it is the Engineer who makes the machine.

As in everything else, the public knows only the last performer. Try to impress people with the fact that a locomotive is the work of a group of Engineers; at most they will recognize in it the work of mechanics aided by engineers, and not a work of engineers assisted by mechanics, although this is indeed the case.

In fact when the enormous bundle of plans, working drawings, calculations, graphs, tracings, nomenclatures, specifications, and estimates, which represent a new model, come out of the engineering office, the machine is as definite a thing as a theatrical production is when the roles are about to be distributed. From this moment the machine is excellent or mediocre; it is created before being realized, and the realization is in a certain way only secondary.

Recently the Russian Press discovered that the study of a big airplane could account for a thousand plans, without taking calculations into consideration.

Indeed, experience is far from being negligible; it will suggest some modifications, and good execution will greatly favor success, but the substantial qualities of the work and the supplementary services which it will confer on equal work, will have had their source in conception and will issue solely from the work of the brain.

REMUNERATION OF BRAIN WORK.—And yet what profit accrues to scientists, to inventors, and to engineers who count within their ranks the majority of inventors?

However, difficult it may be to make an exact calculation, let us try nevertheless to envisage roughly their general remuneration.

In practice, we may say that scientists receive almost nothing of what they deserve: (the labors of Pasteur on the silk worm alone, have been the means of saving 2 billion francs). Let us figure, to be liberal, that scientists are worth, all taken together, only 2% of what is produced.

As for engineers and inventors their total remuneration never equals 10% of manufactures.

We have seen that when, thanks to technics, human labor produces 100 units as against 25, the 75 supplementary units are due entirely to intellectual labor.

Now instead of the 75 units due them, intellectual workers receive as a grand maximum, 12 units, that is to say 12 ÷ 75 or 16% of the integral product of their labor.

Let us not hold too rigorously to this figure of 16% which can only be approximated, but let us remember this conclusion which any one of enlightened and honest mind will recognize as incontrovertible:

"The class of intellectual workers, which is the one which by far produces most, is also the one which by far receives the least in proportion to services rendered."

PROBABLE EVOLUTION TOWARDS SPIRITUALITY.—Finally, holding to the moderate figures which we have established, we find that it remains probable that human productivity will see more and more that its source lies in work of the mind: and the bread of men which once was made up of 90% of human sweat, will contain not more than 10% in the year 2030.

We eat the bread of the spirit; which does not seem to presage especially the evolution of man towards materialism.

M. AVICE, Engineer E.G.C.*

In conformity with the remarkable work of G. Bessiere: *Arithmetic for Statesmen.*

*E.G.C. stands for Ecole de Genie Civil or School of Civil Engineering.

STATE CONVENTIONS

(Continued from page 16)

local committee to make a preliminary investigation and submit the case with all evidence gathered to the State Committee. The State Committee to make further investigations if necessary and to take appropriate action. A list of chairmen of local ethics committees to be sent to the Chairman of the State Committee.

2. The Engineers code, and especially article III, concerning fair practice published in the *Brochure of Information* concerning the Engineer's Licensing Law of New Jersey, etc. assembled for distribution in 1934 should be brought to the attention of all members of the New Jersey Association of Professional Engineers and Land Surveyors, and in addition, if necessary, the code of practice of the American Society of Civil Engineers, especially the section dealing with "The Relation of Engineers among Themselves."

3. Copies of the code of ethics be made available to all new members and such code be sent by local chapters to governing bodies when jobs are open on a competitive basis and in all cases when there are indications that unfair practice may result.

Ethics Committee
G. W. Andress
C. Gilman
C. G. Kreuger
H. J. Sherman
W. Rudolfs, *Chairman*

Report of the Publicity Committee

The Committee on Publicity was appointed on May 27, 1936.

Because of inactivity during the summer and there being no legislative or general matter concerning the New Jersey Engineer deserving of wide-spread publicity, the Committee adopted a three-fold policy. One to publicize local Chapter activity, second to concentrate on publicity in connection with the Annual Convention to be held in Paterson, and third to publicize items of general interest.

This program has been substantially carried out, each Member of the Committee serving as his local Chapter publicity agent and attempting to have published locally the various releases concerning State-wide interest. Six news releases pertaining to the Annual Convention were sent to thirteen daily papers throughout the State, two New York Sunday papers, and because of the Convention taking place in Paterson, to eight weekly newspapers circulating in Passaic County. Additional newspapers (daily) were contacted by the Members in their local districts. Four Engineering Journals have also been contacted. One general story on the lack of recognition given the engineering profession for the great engineering achievements of the day, based on an editorial which appeared in a New York paper, was given State-wide publicity.

The Annual Convention has been widely publicized particularly in the newspaper in Passaic County where releases have been printed each day for the past two weeks.

Respectfully submitted,
Prof. Phillip Kissam
Engr. C. D. Brickley
Engr. Ronald D. Brown
Engr. Herbert Hartman
Engr. George R. Merrill
Engr. Paul P. Rice
Engr. Fredk. W. Loede, Jr., *Chairman.*

Report of Membership Committee

Gentlemen:—

Your Membership Committee has the honor to report its activities for the year 1936 as follows:—

A plan was prepared that it was thought would assist the local Chapters in securing members. It was recommended that the area of each Chapter be divided into a convenient number of individual units and that each unit be assigned to a member of the local committee as his responsibility. He to compile a list of every registered engineer in his area. That he either canvass each non-member himself or assign that duty to another member of his Chapter. That he keep a card record of each case on a uniform card, a model of which was sent to each member of the State Committee together with suggestions for canvassing.

Union County Chapter prepared an extract of Dr. Steinman's report on the activities of the National Society since its inception as they affected New Jersey; this for the purpose of supplying committee members with a ready reference to reasons why all engineers should join the organization. This was sent to all members of the State Committee, with the suggestion that they could have as many as they needed for their local committees so long as the supply lasted. There have been very few calls for them and your Chairman still has a considerable supply on hand.

Some members have been very active and their local Chapters have set up and actively pursued excellently planned compaigns, and with good results.

Other Chapters have apparently not been so active, judging from lack of reports received by your Chairman.

It should be realized that the past year has been a difficult one in which to secure new members or to reinstate old ones. In the first place engineers are still very hard up. While prosperity has doubtless returned to many lines of business, it has not yet discovered a good many of the engineers.

Another difficulty has been the change of the fiscal year to January 1st, thereby shortening the year and effectively raising the dues for the year.

Your Committee advocated the payment of dues on a split year basis, so that new members could be accepted upon the payment of dues for the quarters of the year remaining when they joined. There has been a lot of argument on this point at meetings of the Trustees of the State Association and with the officers of the National Society and no such authority has been granted as yet.

With a new year just beginning this point is not so pressing just now; but candidates cannot be secured after the middle of the year if they have to pay dues for the half year past and for which they consider that they receive no benefit, even though it is argued that they will be just as greatly benefited as any other member by the work that has been done by the organization during the first part of the year.

It has not been possible to get reports on the actual increase in membership during the year in the several Chapters. The Chapters may be able to report that direct to this meeting today.

There is something wrong with the Membership Committee of the State Association that does not effect proper co-ordination betweeen it and the Chapters. An effort was made this year by your President and the speaker to remedy the defect by appointing

as members of the State Committee the Chairman or at least members of the Chapter Membership Committees; but in a number of cases information as to the local appointees was so delayed that it was not possible to follow that plan consistantly.

It was done in so far as possible.

The problem of building up our Membership is a very vital one. Every licensed man in the State should be an active member of the organization. We will perhaps never get 100%, but we should be able to secure a much greater percentage than we have at present. How is it to be accomplished? Your Committee would be glad to receive constructive suggestions.

Don't tell me that is our job. We know it is; but it is also the job of every one of you and it is primarily the job of the Chapter Committee. The State Committee must in a large measure be a clearing house and co-ordinating agency to assist the Chapter Committees. The State Committee iron out with the State Association matters of policy, etc.

While it is realized that this Committee has done some very good work during the past year, the results on the whole have been very disappointing. There has been a very small increase in membership during the year notwithstanding some very intensive campaign work by some of the Chapters.

In closing I would like to suggest that all Chapters immediately appoint their Committees for the year 1937 and advise the State Secretary of their personnel, so that the State President may have that information at hand when he appoints his Committees for the State Association.

This should result in a better co-ordination of the work of the Chapters and the State Body than we have had in the past.

In closing I desire to express my appreciation to all members of the Committee of their loyalty and co-operation during the time we have labored together.

Respectfully submitted,

ARTHUR S. HOBBY,
Chairman.

Nominating Committee

Engineer J. W. Higgins reporting as Chairman of the Nominating Committee stated the following slate had been submitted to the Association as Officers for the ensuing year:

Engr. Beale M. Schmucker of Camden—President

Engr. Gerald W. Knight of Passaic—Vice-President

Engr. Victor Gelineau of Teaneck—Vice-President

Engr. Ernest F. Weeks of Paterson—Secretary-Treasurer

Engineer E. F. Weeks as Chairman of the By-Laws Committee read the following report suggesting changes in the existing By-Laws:

RESOLUTION TO CHANGE PRESENT ASSOCIATION BY-LAWS

For present By-Laws of the State Association, refer to the 1934 Brochure, page 11.

Article 4 to read:

The officers of this Association shall be a President, two Vice-Presidents, Secretary-Treasurer and directors, who with the last two living past Presidents continuing to be members, and a Director to the National Society of Professional Engineers, shall constitute the Board of Trustees, in which the government of the Association shall be vested. The President, two Vice-Presidents, Secretary-Treasurer shall be elected by letter ballot as provided in the rules and regulations of the Association. The terms of office of the President and the two Vice-Presidents shall be one year, and the term of office of the Secretary-Treasurer shall be two years. The Directors shall be divided into two classes, half to be elected each year for a term of two years. Each regularly organized Chapter shall have on the Board of Trustees at all times, a Director, elected by the Chapter. The term of each office shall begin at the close of the annual meeting and shall continue for the period above named or until a successor is duly elected. A vacancy in any office may be filled by the Board of Trustees to serve until an election to fill the vacancy.

A Director to the Board of Directors of the National Society of Professional Engineers shall be appointed by the President, subject to the approval of the Board of Trustees and shall automatically become a member of the Board of Trustees of the Association. The term of office of the National Society Director shall be one year, appointment to be made at the annual meeting by the President and term of office to begin at that time.

Article 5 to read:

The location of the principal office of this Association shall be at the office of the Secretary-Treasurer or such other place as may be disignated by the Board of Trustees.

Article 17 to read:

The annual meeting shall be held at the time and place as shall be determined by the Time and Place Committee at the preceding Annual Meeting and reported at that meeting.

Voting at the Annual Meeting shall be governed as follows. Each Chapter is to have one vote and in addition, one vote for each 25 active members in good standing, or portion thereof. The voting power of each Chapter to be determined and reported at the Annual Meeting from the Treasurer's Receipt Book by a Credentials Committee composed of three members appointed by the President for a term of one year. Voting to be by Chapters, who, through the medium of their accredited delegates will vote at the call of the roll of Chapters by the Secretary on each resolution as presented for vote.

Legislative Committee

Engineer Geo. F. Randolph, *President,*
N. J. Assoc. of Professional Engineers
and Land Surveyors,
60 Broad St.,
Red Bank, N. J.

Dear Sir:

I beg to submit for consideration at the Annual Meeting of the Association on Saturday, January 16, 1937, this report covering the activities of the Legislative Committee of the Association for the past year.

As a primary obligation, I wish to convey my thanks to you for the splendid counsel and guidance and unselfish aid you have rendered this Committee throughout the year.

Your Committee has had submitted for its active consideration many questions that presented considerable of difficulty and complexity. In its deliberations, your Committee has been controlled by the principal that what is good in our legislative structure should be maintained and conserved and that any changes made in the legislative structure should be clearly ameliorative and not detrimental.

Progress has been made by the engineering profession in obtaining legislative recognition and none of this progress can be lost through ill-advised changes in the existing legislation. Stress, then, has been laid primarily toward combating legislation that might seriously and detrimentally affect the engineer's economic status.

A dangerous example was presented by the introduction in the 1936 Legislature of Assembly Bill No. 192, entitled "An Act concerning the practice of law and providing penalties for the unauthorized or prohibited practice thereof," and Senate Bill No. 227, entitled "An Act concerning the practice of law and providing a penalty for the unlawful practice thereof."

These two bills introduced at the behest of attorneys were so sweeping in their provisions that they required the best efforts of engineers and other groups of men that would have been prejudiced by their enactment. If these bills had become law they would have effectually precluded engineers —civil, mechanical, electrical, or any others, from appearing before regulatory bodies, such as state departments or municipal commissions.

As the work of this nature forms a very important part of the work of many engineers in private practice, the results would have been most detrimental. Fortunately, numerous other interests that would have been adversely affected rallied to oppose this legislation and in this opposition your Committee joined its best efforts. While these bills were defeated, your Committee is confident that the purpose to have them reintroduced in some form will persist and must be duly apprehended.

The subject of the alleged subordination of the engineer to the architect recurs frequently in the matters presented to your Committee. The allegation is that the laws governing the practice of engineering and architecture unfairly favor the architect as against the structural engineer, the argument being adduced that the design of large buildings really requires the service of a structural engineer, who is nevertheless dwarfed by the legal requirement that the seal and signature required to give the plans validity must be those of the architect rather than those of the engineer.

Your Committee has doubted the wisdom of having this situation changed by legislation because retaliation by architects could be confidently expected. It is possibly true that there are architects in practice who are not equipped by education and experience to design structures. If so, the remedy would seem to lie in amending the tests for admission of architects to practice because, obviously, the obligation to protect the public against danger from the collapse of defective buildings is not discharged by the Licensing Board if it admits to the practice of architecture men inadequately equipped by education to design safe structures. The present law permits the engineer to design any building required as part of a general engineering project. It does not oust the engineer from designing such building or require that the architect's services shall be brought in. There is no evidence that the architect has been encroaching upon the domain of engineering design and construction that is generally conceded to belong to the engineer.

Why then insist that architectural plans for buildings shall bear the seal of a licensed engineer? Engineers must be cautioned that opening to the engineer the field generally recognized as belonging to the architect might well result in opening also to the architect the field now admittedly monopolized, and properly so, by the engineer. It is admitted that the present law can be improved and the New York practice is being carefully reviewed in the study now underway as a preparation for the revision of the New Jersey engineering statutes.

This leads to a discussion of the demand for a general revision of the statutes govering the practice of engineering. As can be said of any other body of statutes which reflects rather painful progress in establishing new doctrines, the present statutes can doubtless be improved through revision. However, if adequately enforced they do give protection to the engineer. It is conceded that the benefit from this protection goes largely to the civil engineer as distinguished from the mechanical, electrical, or chemical engineers, and the best efforts of your Committee should continue to be exerted toward spreading a larger measure of protection to these engineers in branches other than civil engineers.

As a practical matter, which must be considered in this respect the electrical, mechanical or chemical engineer is seldom in private practice, but is almost invariably an employe or officer of a public body, or public utility, or industry. He is not in open competition with other engineers and his work is generally blended with the efforts of others into some saleable product or service, such as that furnished by public utilities.

Of general interest, not requiring extended review in this report, is the decision of the Association to abolish the sub-divided or classified titles of the engineers in this State and to apply the general title of Professional Engineer. Also, of general interest has been the agreement that the fees for renewal of licenses should be increased to $5.00 to cover the engineer's license, or the surveyor's license.

Your Committee also participated in the discussion of the ways and means to halt the activity of certain municipal bodies in obtaining through P.W.A. auspices allocation of engineers to make municipal tax maps. To your Committee was presented the matter of drafting legislation to prohibit this practice, but the general opinion was that this evil practice by which private engineers were ousted from a field of work properly belonging to them can be best combated by moral suasion and pressure upon public bodies through local engineering representatives.

It is regretted that there is not now ready for submission to the Association in meeting a draft of revision of the laws under which engineers operate. They can only request the forbearance and patience of the membership on the plea that the proposed revision when offered shall be sound legally and shall not sacrifice the interest of the engineers. And, we offer the further plea and defense, as a tribute to our predecessors who have worked for the enactment of our present laws, that they are working well although we should not be complacent but should be progressive.

Respectfully submitted,

VICTOR GELINEAU,
Chairman, Legislative Committee.

Report of Director to National Society of Professional Engineers

To conserve time and eliminate a duplication of records, I refer you to the comprehensive and all inclusive report of your State Secretary covering the minutes of your Executive Board of Trustees, held at the Hotel Douglas, at Newark, N. J., November 30, 1936. Page 6 to 8 inclusive, touch all the high lights of the National Society Convention, held at the Mayflower Hotel in Washington, D. C., October 13 and 14, 1936.

The meeting of the Board of Directors of the National Society of Professional Engineers, was called to order Saturday morning, November 21, 1936 in the National Press Building, Washington, D. C. A complete record of this Meeting has been furnished Secretary Weeks by Willard S. Conlon, Secretary of the National Society.

The interests of New Jersey were properly safeguarded at both the above Meetings, as an examination of the records will show.

After attending these sessions, I am firmly convinced that the various State Societies can ill afford to be without representation in the National Society no matter where the Meeting may be convened. The expenses of the Delegate or Director should be (as they were in my case) borne by the State Society.

My thanks for the honor and confidence reposed in me by naming me alternate in place of our Vice-President and beloved fellow Engineer, Gerald W. Knight.

May I hope that my services have proved as able and satisfactory to you as I know his would have been had he attended the sessions.

Respectfully submitted,

CLAIRE TILTON.

Engineers-Architects Committee

Engr. Geo. Randolph, *President,*
New Jersey Assoc. of Professional
Engineers and Land Surveyors.

Dear Sir:

Your Committee of Engineers on the Architects and Engineers Advisory Council submits herewith its report on the activities of the Council for the past year.

The Committee has held several meetings and carried on extensive correspondence preparatory to recommending proposed legislation covering the practice of engineering in New Jersey, with particular reference to the field of structural engineering as it might apply to the practice of architecture and engineering. Our discussions were at first devoted to the possibility of using the Licensing Law of New York State as a basis for our proposed act, insofar as the field of building design is concerned. Changes of a very extensive character in the existing acts, which regulate the practice of architects and engineers, would result if this method were adopted and might involve prolonged discussion and delay before the wording would meet the approval of both professions.

In view of the fact that the objections raised by engineers to existing procedure is based on the prevalent interpretation of Article 13 of the Act to Regulate the Practice of Architects, which restricts engineers to the design of buildings incidental and/or supplemental to engineering projects, it was finally agreed by both the architects and engineers on the Advisory Council that the most expeditious manner of solving this difficulty would be by clarifying this Article 13 by the addition of wording which would leave the field of the design of buildings of a fundamentally structural character open to engineers as well as architects. It was also considered advisable that in order to further clarify Article 13, that there be included the types of building structures which would be considered to be a primarily structural character.

Your Engineer's Committee feels that with these changes in Article 13, the objections to the existing wording will be eliminated and that the difficulty between both professions, which has been the subject of considerable discussion during the past few years, will have been solved to the mutual satisfaction of both professions.

The approval of the State Association is requested to this arrangement, as well as an expression of gratitude to the Committee representing the New Jersey Chapter of the American Institute of Architects, for their co-operation in considering the adjustment of their present legislation.

Respectfully submitted,

MORRIS GOODKIND
HUGH CLARKE
R. P. MCCLAVE

RESOLUTION

Establishment Survey Bureau

WHEREAS, it has come to our attention that the New Jersey Geodetic Control Survey has already completed a considerable number of surveys, both for position and elevation, and that these surveys are monumented by some 2000 monuments and rivets throughout the State; and

WHEREAS, the Federal Government has already expended upwards of half a million dollars in the establishment of this work for the State of New Jersey and that it is evident that the Federal Government cannot continue to expend money for this purpose indefinitely, nor can it provide the State with the proper bureau of surveying and mapping for the purpose of making available to the State the survey data obtained; and

WHEREAS, it has come to our attention that the Board of Conservation and Development is making plans to establish such a bureau provided the proper funds be appropriated, be it

RESOLVED, therefore, that the New Jersey Association of Professional Engineers and Land Surveyors advises the State Legislature that from a professional standpoint such a bureau should be established within the State which will be properly manned and equipped to perform the following functions:

1. Maintain all survey marks now established.
2. Provide supervision of any surveys for the extension of the legal control base as described in P. L. Chapter 116, L-1935.
3. Be equipped to re-establish any survey marks destroyed or disturbed.
4. Be equipped to establish small extensions to the system when requested by governmental agencies.
5. Be equipped to care for the records of the survey and to make these records available to the public.

RESOLVED, further that copies of this resolution be sent to:

Governor Harold G. Hoffman.
Dr. Henry B. Kummel, Director and State Geologist, Dept. of Conservation and Development, State House Annex, Trenton, N. J.
Chairman of the Appropriations Committee.

John A. Reddan, Budget Commissioner.
Senator Clifford R. Powell, Chairman
Senate Appropriations Committee.
Assemblyman, Samuel Pesin, Chairman
Assembly Appropriations Committee.
Motion passed unanimously—35-0.

RESOLUTION

WHEREAS, up to the present moment it is evident that the Annual Convention will eclipse all preceding functions of this character, and

WHEREAS, the success of the Convention is due largely to the untiring efforts and the business management of the Passaic Chapter, more particularly to those members of the Convention Committee under the Chairmanship of Engineer Vincent J. Scanlan, and,

WHEREAS, all events point to a successful termination of the Convention, therefore

BE IT RESOLVED, that this Association express a grateful appreciation to Passaic County Chapter and its Convention Committee for the results of their efforts.

RESOLUTION

Study Highway Traffic Needs

WHEREAS, A State-wide survey of road and traffic conditions is desirable in order to assist the Legislature in determining its future policy with respect both to the construction and maintenance of streets, roads, highways and footpaths and it is desirable to ascertain the facts with regard to volume, character and distribution of traffic on streets and on primary, secondary and tertiary roads; and

WHEREAS, It is essential that an economic survey be made to reveal sources of highway revenues to the end that road construction, both rural and urban, may be considered in accordance with the facts and funds equitably distributed for street and highway purposes; now, therefore, be it

RESOLVED, that a Commission is hereby created to consist of four citizens of the State representing respectively agricultural interests, municipalities, automobile owners and licensed professional engineers, one member of the faculty of Princeton University and one member of the faculty of Rutgers University, to be appointed by the Governor of the State of New Jersey and that the State Highway Commissioner shall by virtue of his office be a member thereof.

That such commission shall elect a chairman and vice-chairman from its membership and shall appoint, and at pleasure remove, counsel, engineers or other assistants as may be necessary, including as far as practicable, persons experienced in the work to be undertaken by the Commission.

Such Commission shall have full power and authority and it shall be its duty to make a study and survey of the highway traffic needs and requirements of the State and shall formulate a complete highway and road building policy for the State and its sub-divisions and make recommendations as to the means of financing same. Said Commission shall make a thorough study of engineering, economic and practical problems, such as new locations for avoiding congested areas; the construction, reconstruction and regulation of public streets, highways, roads and footpaths in the State including a systematic all-year maintenance program and snow-removal; a rational order of improving secondary roads and highways and local roads and their correlation with the highways on the primary system of the State; the classification of arterial highways; the adoption of the parkway system; highway research as a departmental and academic study together with such other recommendations for improvement and increased efficiency and economies in connection with highway construction, maintenance, classification, operation and supervision of arteries of vehicular traffic, bus and truck regulations thereon, the regulation of out-door advertising adjacent to highway rights of way and the installation of traffic signs and control signals by State agencies as may seem relevant in the premises.

In making any surveys, studies, examinations, investigations and compilations requiring engineering services, clerical and stenographic help, the Commission, with the consent of department heads, shall utilize such officers and employes of State departments as far as practicable and as they find necessary and they may request and shall receive advice and expert assistance from such departments and commissions of the State and each and every officer or employe thereof; and the cost of such services and assistance and prementioned appointments shall be paid from any moneys allocated for such work by Federal Aid and/or appropriated and available for construction, reconstruction and maintenance of State highways.

That such Commission shall have power to compel the attendance of witnesses within the State and the production of books and papers and otherwise shall have all of the powers of a legislative committee as provided by the Legislative Law, including the adoption of rules for the conduct of its proceedings.

That the members of such Commission shall receive no compensation for their services but shall be entitled to be paid their actual and necessary expenses incurred in the performance of their duties.

That such Commission shall hold public hearings within or without the State from time to time as the progress of its work may warrant and shall make a report of its proceedings together with its recommendations to the Legislature on or before the first day of February, 1938.

That the sum of $10,000 or so much thereof as may be needed is hereby appropriated from the contingent fund of the Legislature for the expenses necessarily incurred by the Commission, and the money so appropriated shall be paid from the treasury upon audit and warrant of the necessary State officer upon vouchers approved by the chairman in the manner provided by law.

Concrete Institute Convention

The thirty-third annual convention of the American Concrete Institute is being held this month in New York City with the Roosevelt Hotel as convention headquarters. The dates are February 23, 24, 25 and 26 and the program includes timely discussions of important developments in concrete design, concrete construction, concrete manufacture and concrete research.

The New York Convention Committee in charge of arrangements includes: J. P. H. Perry, General Chairman; R. R. Zipprodt, Secretary; John G. Ahlers, R. A. Backus, R. L. Bertin, Joseph H. Chubb, J. R. Fairman, C. F. Hulsart, D. S. MacBride, E. H. Praeger, F. E. Schmitt, M. M. Upson, and Duff A. Abrams, A. Burton Cohen, A. W. Stephens and D. B. Steinman, Consulting Engineers.

N. Y. State Board of Examiners Operating on Busy Schedule

The 165th meeting of the New York State Board of Examiners for Professional Engineers was held at the American Society of Civil Engineers, New York City, February 8 and 9. A total of 526 applications were considered, following previous detailed review of these applications by the five individual members of the Board. Of this total number of applications, 64 were held for further consideration, 180 were scheduled for written examinations, 164 were rejected, and 118 were approved for license.

The Board still has before it for consideration approximately 3000 applications filed during December 1936, and is working under pressure to act on these cases in time for assignment to the June examinations. It may prove humanly impossible to handle the applications filed since January 1, 1937 before June, and these may have to wait for assignment to the examinations in January 1938.

National Meeting In Youngstown February 25

The National Meeting of the Association of Iron and Steel Engineers is being held Thursday, February 25 in Youngstown, Ohio.. A technical session will be held at 9:30 A. M. in the ballroom of the Ohio Hotel, and the subjects to be discussed are: "Manufacture and Use of Rolls," "Continuous Pickling Tank Construction," and "Ward-Leonard Control for Blooming Mill Auxiliary Drives."

At 1:15 A. M. an inspection trip will be made to the Hot and Cold Strip Mills, Youngstown Sheet and Tube Company and Campbell Works, Youngstown, Ohio.

Participating Societies are: American Institute of Electrical Engineers, American Institute of Mining & Metallurgical Engineers, American Society of Civil Engineers, American Society of Heating and Ventilating Engineers, American Society of Mechanical Engineers, American Society for Metals, American Society of Safety Engineers, American Welding Society, Association of Iron & Steel Engineers, Engineers' Society of Western Pennsylvania, Illuminating Engineering Society, Institute of Radio Engineers, Physical Society of Pittsburgh, Pennsylvania Society of Professional Engineers, Science of Metals Club, and Society of Automotive Engineers.

Where Friendliness and Co-operation Prevail

The Connecticut State Association of Power Engineers, an institution limiting its membership to qualified operating engineers, has submitted a Bill to the 1937 Connecticut State Legislature for the purpose of passing an act to license operating engineers who are qualified in the maintenance and care of power plants.

The Professional Engineers of the State through the *Connecticut Society of Professional Engineers* are backing this very necessary legal precaution for the protection of the public life and property from the danger of irresponsible operation by incapable persons, and are doing all that they can to assist with the State Senators and Legislators in obtaining the passage of a desirable licensing law for the Operating Engineers, which will not be in any way in conflict with the Professional Engineers Registration Law or prerogatives.

The friendliest feelings between the Professional Group and the Operating Group are in existence in Connecticut and the attitude of both is that of mutual cooperation and help. A policy on both sides has been adopted of frank and friendly discussion and the exposing and killing of any disquieting

rumors which might tend to cause misunderstanding before they can assume a serious aspect.

The Professional Engineers have already blocked proposed legislation in regard to Power Plants which might be advantageous in some cases to some Professional Engineers, but on the other hand, might be adverse in some instances to the Operating Engineers. This has been done in an unselfish and generous spirit.

If both groups throughout the Country can follow the lead laid down and followed in Connecticut, much can be accomplished through such friendly cooperation and mutual support.

Lehigh Valley Chapter Has Dinner Meeting

The Lehigh Valley Chapter of the Pennsylvania Society of Professional Engineers held a dinner meeting, Thursday, February 18 in the Washington Room of the Old Sun Inn, Bethlehem, Penna. The principal speaker was Engineer C. E. Myers, President of the State Registration Board and Director of the American Society of Civil Engineers. His subject was "Functions of the Registration Board." Following his talk Engineer Myers answered questions from the floor.

H. L. Ramage is President of the Lehigh Valley Chapter, and V. W. Anckaitis is Secretary-Treasurer.

Air Hygiene Foundation Has Annual Meeting

Three industralists and a representative of the U. S. Bureau of Mines were added to the Board of Trustees of the Air Hygiene Foundation at the annual meeting held at Mellon Institute, Pittsburgh, February 9. Roger A. Hitchins, President of the National Refractories Company, Philadelphia, was reelected Chairman of the Board. The new Trustees are:

Daniel Harrington, Chief of Health and Safety, U. S. Bureau of Mines, Washington, D. C.; Joseph Dilworth, Assistant to President, Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa.; Andrew Fletcher, Vice-President, St. Joseph Lead Company, New York; and E. A. Hults, Vice-President, Mathieson Alkali Works, New York.

Besides Mr. Hitchins, the following officers were reelected: H. A. Schultz, U. S. Steel Corporation, New York, Vice Chairman; Lloyd T. Williams, Toledo, Ohio; Secretary, and Dr. B. D. Sakaltwalla, U. S. Rustless Steel & Iron Corporation, Pittsburgh, Treasurer. Other trustees reelected include:

V. P. Ahearn, National Industrial Sand Association, Washington; Vandiver Brown, Johns-Manville Corporation, New York; C. E. Lesher, Pittsburgh Coal Company, Pittsburgh; Dr. R. R. Sayers, U. S. Public Health Service, Washington; A. W. Sherwood, Owens-Illinois Glass Company, Toledo, Ohio, and William P. Yant, Mine Safety Appliances Co., Pittsburgh and formerly of the U. S. Bureau of Mines.

H. B. Meller, Managing Director, announced that more than 100 industrial firms have affiliated with the organization since the membership meeting November 1936. The Foundation is a non-profit, scientific organization with headquarters at Mellon Institute. Its primary purpose is to conduct research on industrial disease problems arising from air pollutants.

Machine-Made Jobs

(Continued from page 13)

But such developments as sound pictures and radio have greatly increased the public demand for music and similar entertainment.

And the United States census shows that musicians and teachers of music increased from about 130,000 in 1920 to more than 165,000 in 1930; actors increased from 20,000 to 37,000; and theater ushers increased from 5,200 to 12,461. Furthermore, the United States Department of Labor found evidence that the introduction of sound pictures increased employment of motion picture machine operators about 30 per cent between 1926 and 1931. More than 15,000 persons are on the radio industry payroll and they receive almost 27 million dollars a year.

What Happened to the Farmers?

Workers in the distributive and service trades have increased faster in recent years than have producers of goods, which might seem to indicate that machinery is destroying employment opportunities in what are known as the "productive trades"—manufacturing, farming and mining.

But the growth of employment in the productive trades has been retarded chiefly by a decline in agricultural workers, which is due as much to declining foreign markets and improved plant and animal breeding as to machine displacement.

And the jobs in the distributive and service trades have been indirectly created by machines, because they are due to increased factory production. There are more goods to be handled and sold, and as a result more workers are employed. The net gain for all occupations between 1900 and 1930 was about 68 per cent, while population increased only 62.5 per cent. The gain in the manufacturing industries was 88 per cent, which never could have taken place had not workers been released from other lines.

Women and Children First

Many jobs formerly requiring hard physical labor by men are now being done by machines that are so simple they can be run by women and children.

But the proportion of women and children in industry is constantly getting less, and the proportion of men is growing larger.

And child labor has dropped more than 75 per cent since 1900. Less than one child in twenty between the ages of 10 and 14 is working today compared to one in five at the turn of the century. In 1890 about 25 per cent of all employed women were in the manufacturing and mechanical trades, but in 1930 only 17 per cent of them were in these trades. More of their jobs were in the lighter sales, clerical and office jobs and in the professions in 1930 than earlier. During the same period the number of men in the manufacturing and mechanical industries increased from less than 5 million to more than 12 million.

Production Increases Faster Than Employment

Factory employment sometimes does not increase as fast as production because machine production can be stepped up without adding a proportionate number of new workers.

But there is no advantage in having production volume and hand labor rise and fall together. The average American family would not enjoy the present high standard of living if the increased production of goods had depended only on more hand labor.

And history shows that production has to rise if employment is to rise. During no year since the beginning of the depression has factory production been at a higher percentage of the 1929 level than employment. Between 1899 and 1929 factory employment increased 88 per cent, and this increase was possible only because factory production was three times as great in 1929 as it was in 1899. At the end of the period factory workers were being paid more than 4 times as much as they were at the beginning.

But Consumption Is Limited In Some Lines

Food consumption is relatively inelastic and cannot be increased to increase employment when machine methods of manufacturing and packing are employed.

But the amount of food processed and packed is constantly increasing while the amount raised or made at home is decreasing.

And machine operators in the food and allied industries increased about 20,000 between 1920 and 1930, according to the United States census. During the same period the number of grocers and food retailers increased from 441,000 to 552,000 —a 25 per cent increase compared to a 16 per cent increase in population.

Millions Unemployed Still More Machines

More and better machines are constantly being invented and installed.

But the rate of new inventions and discoveries, in proportion to population, is declining according to a sociological study of inventions made by Dr. S. C. Gilfillan. Furthermore, the study showed, the purpose of five inventions out of six is to create new goods or furnish new services or improve old goods and services, rather than to save labor.

And factory employment rises when machines are being installed and falls when the rate of installations drops. During the depression there were fewer machines installed than for many years, and unemployment was greatest. Even the increase in production per man hour which has taken place since 1929 bears no relation to machine installations during the period, according to the National Industrial Conference Board. Production per man hour was at its highest peak in 1933 when machine tool orders were at their low ebb of 12 per cent of the 1926 level, and when they had been far below normal for more than three years. During the depression

when payrolls had to be cut the most efficient workmen were retained, and only the best equipment in a plant was used. These and similar factors made it possible for production per man hour to increase during the depression, according to the Board's analysis.

Does the Boss Get All the Profits?

Employers own the machines and they can produce more goods with lower labor costs than if all work were done by hand.

But when workers have machines to help them they produce more and their earning capacity is higher. The cost of the things they buy is also less than if all goods were made by hand; the result is that the worker enjoys both higher wages and lower prices for what he buys as a result of machinery.

And although larger amounts of money are needed to install and maintain the highly mechanized plants of today, workers get a larger part of the total national income than ever before. In 1900, 53 per cent of the national income went to wages and salaries; in 1920 the figure was 63 per cent; and in the last few years it has been about 67 per cent.

Why Machines, If Not to Displace Workers?

The very purpose of machines is to cut production costs, which in many cases means eliminating labor.

But most machines are installed to improve quality and make it possible to sell a product for less money or to make an entirely new product.

And all of these factors tend to increase the market for goods, and when more goods are sold more workers are hired to help make them. Even though the cost to make each piece is less, the total amount of work to be done and the total wages and salaries paid to workers increases, rather than decreases, when machines are installed. For the nation as a whole mechanization took place faster between 1900 and 1930 than in any other 30-year period, and employment in the manufacturing and mechanical industries increased from less than 8 million in 1900 to 10½ million in 1910, to about 12 million in 1920 and to more than 14 million in 1930. Machine development was responsible for the creation of eighteen new industries between 1879 and 1929 which at the end of the period furnished jobs for about one-eighth of all factory workers.

ONE ANGLE OF THE FLOOD PROBLEM

Rivers out of their banks caused little or no loss to the Indian inhabitants of precolonial days. The white colonists who came over the Alleghenies, however, traveled farther inland by boat and established their settlement close to the banks of their river highways. From the first they felt the wrath of rising waters. When great cities grew up and industrial districts, railroad yards, and warehouses were forced into the low-lying regions, even floods of no greater magnitude than those of prehistoric times could take a rising toll of lives and dollars.

But the things that modern civilization—man-made geography—has done to the face of the earth have raised flood levels year after year. Streams that formerly utilized their age-old safety valves by spreading over worthless low lands have been confined by embankments and levees. Forests have been cut down; ground has been covered with the sloping roofs of buildings; streets and roads have been made impervious to water by paving; drainage ditches have been dug; hillsides have been plowed carelessly. Every falling drop of water in great areas has been helped to flow more quickly into streams—streams that have themselves been narrowed. Each decade, therefore, has seen odd flood levels, passed even when rainfall has not increased. (Condensed from National Geographic Bulletin).

The Importance of English to the Engineer in Industry

By **C. F. KETTERING**
General Motors Corp., Detroit

Reprint from Journal of Engineering Education—January, 1937.

A man's English is an index to his mind. A paper or report that is clearly and precisely written indicates sound reasoning and reliable results. An obscure, poorly, written manuscript may disclose illogical and muddled thinking.

Success in engineering and research depends as much upon the ability to present an idea convincingly as it does upon the ability to perform calculations or experiments. You may perform the most miraculous experiment in the laboratory, yet you have not contributed anything to the advancement of knowledge until you have transmitted your results to others. It is only by speech and writing that the discoveries made in the laboratories are made useful. Scientific men too often look upon writing reports or making talks as an irksome part of their job and do as little of it as possible. Engineering work is not finished until the results are clearly recorded and presented to others.

The everyday use of English by the engineer is to write technical reports on his work for presentation to other engineers or to the management. These reports must present the results of his investigation in an accurate and orderly manner to those immediately interested in the work, and also to acquaint executives with the progress being made on the subject. After years of trying different methods of preparing technical reports, we have developed a procedure which makes it possible for everyone interested in the work to get the information he is after. On the first page, we start with a short foreword which explains, in general terms, the subject and reasons for the investigation. The second page contains the conclusions; concise and to the point. For the busy engineer or executive, the whole story is on the first two pages. The remainder of the report contains a complete history of the development for the men who may be interested in the details of the project.

But in a larger sense, the engineer has an opportunity to use English in furthering the general understanding of the economic forces at work in our civilization. One reason why scientific work is publically discredited and blamed for economic difficulties is because it is not understood by the average man. Science and engineering needs interpreters to translate its findings into terminology understandable to all. One of the greatest problems in engineering and in science is to take a few days off and try to make plain to many people, the things we know so well. In other words, we need to get information, technical and otherwise, to flow down through to the public, because they are hungry to read and learn about the technical world. It is the job of the engineer or scientist, who has the technical background, to interpret the technical facts upon which modern civilization is based into language which everyone can understand.

The engineer who learns to master English and use it in these two important ways will do most to advance his chosen profession. He will be able to present his own investigation to his fellow engineers. More important still, he will be able to gain the understanding of our people who are interested in technical subjects, yet need them explained in simple language.

E. M. Fleming Made Eastern Manager

The Portland Cement Association has announced the appointment of E. M. Fleming as Regional Manager, Eastern Offices, effective January 15. Mr. Fleming since March 1, 1935, has been District Manager in charge of the New York Office.

Mr. Fleming has been a member of the Association staff since 1926, having joined the Association as a field engineer in the Indianapolis District. He was transferred to the General Office in 1928 and served as street engineer in the Highways and municipal Bureau for one year prior to his appointment as Manager of that bureau.

While Manager of the Highways and Municipal Bureau he directed the Association's concrete road condition survey of over 6,000 miles of concrete roads in ten states. Mr. Fleming also directed the construction of the Elmhurst cement bound macadam test road, built by the Association to get data on the best methods for building this type of pavement.

Mr. Fleming, as Manager of the Highways and Municipal Bureau, has represented the Portland Cement Association on committees of the Highway Research Board, American Society for Testing Materials, American Road Builders' Association, American Concrete Institute and other national technical organizations.

Prior to coming to the Association Mr. Fleming was associated with the Illinois Division of Highways in various executive capacities for approximately six years. He is an alumnus of the University of Pennsylvania and is a member of the American Society of Civil Engineers.

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A DOCTOR DISSENTS

Dr. Mayo, of Rochester, Minnesota, does not belong to the crop restrictionists in the professional fields. Deploring the attitude that we have too many doctors or lawyers, the eminent surgeon has scant sympathy with those who would steer young people away from the skilled professions. Insofar as higher academic hurdles make it difficult for the badly prepared to enter, Dr. Mayo approves, but he places his veto when barriers are erected to make a closed corporation of any skill or profession.

Those who favor schemes whereby fewer members should be admitted to the bar, or fewer doctors granted diplomas, do not assert that the nation has too many who are especially fitted or skilled in these professions. It is the competition of those badly prepared which causes the apparent plethora. But the better service of the public will not be accomplished by the return to the practices of the medieval guilds or to the restrictions of the kind which the Nazi state imposes. It is universally observed that when a guild becomes an aristocracy, of the self-perpetuating type, the initiative of its individual members declines. Real progress in higher professional standards, and in cutting down the over supply which drugs the market, can be made under the American system, which leaves the race open to all but gives its prize to those that are fittest.

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